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THE

SANITARIAN,

A MONTHLY MAGAZINE

DEVOTED TO THE

PRESERVATION OF HEALTH, MENTAL AND PHYSICAL CULTURE.

VOLUME XII. JANUARY TO JUNE.

A. N. BELL, A.M. M.D., Editor,
T. P. CORBALLY, A.M., M.D., Associate Editor.

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INTRODUCTORY NOTE.

TWELFTH YEAR.

With the beginning of this the twelfth year and twelfth volume of THE SANITARIAN, after one year's trial as a weekly, the monthly period of issue is again resumed, as being more satisfactory to a large majority of its readers and contributors, who have given expression to their preferences. Of other important changes it speaks for itself—in improved paper, type and style. It shall not be lacking in a corresponding effort to fulfill all that is expected of it.

Based at the outset upon a somewhat extensive field of observation in various climates, considerable experience in dealing with epidemics and practical sanitation in some of its most important aspects, THE SANITARIAN has not been wanting in pronounced opinions on various subjects and questions which have arisen from time to time in its field of view. Whether this course has had anything to do with it or not, it has won a universal recognition as an authority on most subjects of practical sanitation.

THE SANITARIAN has been, is, and will continue to be devoted to sanitary science in its most comprehensive sense, based upon substantial knowledge, with a careful avoidance of premature conclusions. It has no business purposes outside of its intrinsic value in relation to the science and art of promoting and protecting the public health, mentally and physically, in all of its relations; and in the investigation, presentation and discussion of subjects in this large domain of inquiry, a weekly publi-

cation has proven to be a constant source of inconvenience to contributors, editors and readers. Many subjects cannot be adequately considered with reference to the allotted measure of space and variety in suitable dimensions for a weekly publication, and to divide papers of this character is frequently to impair their strength. The change back to a monthly is, therefore, in complete keeping with its constant object—to make use of the best available means for the fulfillment of its purpose. It will continue to seek out and discuss in the same independent and earnest manner as hitherto, all causes in conflict with health, and, so far as possible, to render sanitation a popular theme of study and universally practical.

A. N. BELL.

THE SANITARIAN.

JANUARY, 1884.

NUMBER 170.

WHAT SHALL BE DONE WITH THE SEWAGE?*

The most important question that can engage the attention of sanitarians at the present day is—What shall be done with the sewage? If there is any truth in the germ theory—a theory which, it is safe to say, is the accepted doctrine of the most advanced investigators everywhere—most of the sewerage in vogue requires important modifications or abandonment; for it is quite certain that sewers, as now commonly constructed and appointed: of porous material, large size, with surface ventilation, subject to the retention of sewage in process of putrefaction, and depositing their contents at the margins of water courses which wash the shores of populous places, are better calculated to promote disease than to prevent it.

The absolute necessity of the prompt removal of sewage is no longer a question—all civilized communities recognize it. The innate abhorrence of matter so offensive to the senses is unquestionably based upon the danger of its presence—a natural recognition, shared even by many amimals which bury

* Read before the Maryland Sanitary Convention, Nov. 28, 1883, by A. N. Bell, and published by permission of Maryland State Board of Health, from advance sheets of forthcoming Annual Report.

their excrements, or otherwise remove them out of their sight and smell. If nature thus makes known her invisible laws by instinct, where reason cannot discern them, it is surely the unmistakable inference that the excreta of all carnivorous animals, those which practice the instinct of getting rid of it at least, and of human beings, should be speedily removed, if not, indeed, put into the ground, as the most effectual of all means of removal; and the most certain of all means of restoring to the earth that which has been taken from it for the support of nutrition.

We have no need, in this connection, to go into an elaborate discussion of the special fitness of the soil for the accomplishment of this purpose. It will suffice to state, briefly, the composition of human excreta, and the explicit conclusions based upon the fundamental laws of national economy.

Taking the results of a number of analyses sufficiently complete to give a fair average, the mean amount of human excrement per individual, during 24 hours, in ounces is 50.18: 4.17 ounces fæces and 46.01 ounces urine. (In detail: of dry substances, 2.716 ounces; mineral matter, 0.643; carbon, 0.982; nitrogen, 0.531; phosphates, 0.257).

In a mixed population, according to Dr. Parkes, the actual amounts voided are considerably less than this average, or not more than 2½ ounces of fæcal matter and 40 ounces of urine daily, for every individual; an estimate which gives 25 tons solid fæces and 91,250 gallons of urine for every 1,000 inhabitants. It is hardly necessary to state that of the composition as above given, nitrogen and the phosphates are the very things most needful for plants. To estimate the value of these substances, it has been calculated that the average amount of ammonia—representing the nitrogen in that form—discharged annually by one person, taking the average of both sexes and of all ages, is about 13 lbs., and the money value of the total constituents of the excreta is, in urine, about $1.75; and in fæces about 30 cents, or one-sixth as much only as the urine: the total value being about $2.00 for every individual. Apropos to this estimate Professor Thudichum remarks:

"1. The basis of human life, the very root of society, is the capacity to produce food in such quantities that a surplus of it may be exchanged for commodities resulting from the labors of other people unable to produce food.

"2. This capacity to produce food must be rendered permanent by a strict observance of the laws of nature regulating vegetable life, the knowledge of which is the basis of agricultural science.

"3. The first and most important of these laws is that we must return to the soil the mineral ingredients we have taken from it in gathering our crops. The atmosphere furnishes the nutritious elements, and the soil the minerals, out of which vegetable fibres, vessels and structures containing food are built up. Without these mineral ingredients no harvest can properly flourish.

"4. "These mineral ingredients are continually ejected from human beings and animals in their excrements; by returning which to the soil we furnish it with building materials for new crops, at the same time keeping pure the atmosphere we breathe and the water we drink, and thus preventing epidemics and (premature) death."*

But I would not divert attention from the main issue.

However essential agriculture may be to the welfare of man, as related to our present purpose it is of secondary importance. If, however, the safest, the most efficient and most economical way of excreta disposal, is also the most promotive of agriculture, as we believe it is, so much the better.

But the art of sanitation has not kept pace with science in this regard. Valuable as the constituents of excreta have been shown to be, the means of utilizing them are yet far from having been rendered thoroughly practicable. Considered in its most comprehensive aspect, sewage, as we have to deal with it, is polluted water. Reference is here made, of course, to the sewage of populous communities under the most universally preferred means of sewage disposal—water carriage. As thus presented, sewage consists of a specially offensive portion, excrementitious matter discharged from water closets, privies and gully holes; kitchen slops, containing vegetable and animal washings and other refuse; soapsuds and dirt from the laundry; drainage from stables, barnyards and slaughter houses; and ground surface washings and filth in various proportions. According to an average of the gross amount, based upon the most reliable English statistics, 100,000 gallons con-

* Grundlagen der öffentlichen Gesundheitspflege in Stadten. Frankfurt, 1865.

tain about 70 gallons, or one part in 1,300 of substances in solution ; 40 gallons, or one part in 2,500 of suspended matter—a little more than one-half of this latter being mineral, and the remainder organic matter. Now, how to separate and utilize this one part of plant food in 100,000 parts of sewage, consistently with practical economy, we have not yet learned, and until we have, we must continue to bend our efforts wholly for the protection of the public health, by the disposal of sewage in all its forms as completely and expeditiously as possible, regardless of side issues and ulterior benefits.

Water carriage as at present practiced is divisible into two kinds—the combined and separate systems, both dependent upon the ultimate disposal of the sewage—whether directly into the sea, tidal water, inland river or lake, or to the soil ; both systems being alike subject to modifications suitable to the circumstances, independent of, or in combination with means for separating the solid portion of the sewage from the liquid.

The *Combined* system consists of a single line of street sewers sufficiently large to receive all storm water, provided for by basins at the street corners, all waste water and drainage from manufactories, stables, abattoirs, etc., together with the house sewage and the roof and yard waters. Hence, the mains in large cities are frequently great tunnels from six to fifteen feet in diameter. Being commonly constructed of brick or other porous material, their walls are saturated with filth in constant process of putrefaction, and incessantly giving off foul emanations.

With capacity adapted to the amount of rainfall in the heaviest storms, they are flushed only at such times, when they run nearly full. Other times, and especially in time of drought, they contain comparatively little sewage, but are full of gas constantly seeking the easiest means of escape, whether in or outside our houses ; and on the setting in of a storm, by the pressure of water, the ordinary traps to house fixtures are a well nigh useless appendage. Ostensibly to prevent the escape of sewer gas under such circumstances, many contrivances have been adopted for deodorization and ventilation, but in view of the now generally accepted theory of the germ origin of disease, and that sewer air is a prolific source of disease germs, such sewers are deservedly looked upon as danger-

ous to the public health. They should be discarded—wholly converted to the purpose to which they are only suited, storm water conduits, but with such additions as will also drain and cleanse the soil. Thus converted, they would constitute the first part of

The *Separate* system. This consists of two parts: first, that which has already been indicated, to drain the soil and carry off all surface waste and storm-waters; and second, a small, non-absorbent and impervious pipe system of only sufficient calibre to carry excreta and house-water, and without surface ventilation or other opening (except for light and hand-holes in case of obstruction)—ventilation being accomplished by the open ends, of full calibre, of every house-drain connection extending above the roof. Flushing is provided for in this system by means of syphon flush-tanks at such intervals and distances as to effectually prevent the retention of any sewage long enough for putrefaction to take place.

In cities of 50,000 population or less, with favorable surface —as in the case of Memphis—this, the *second part* only of the separate system, may be laid in conjunction with surface drainage.

But in cities of larger population the separate system comprehends a separate line of pipe of sufficient calibre, with subsoil-yard branches and street gutter connections at such intervals as may be required to carry off all subsoil, storm and surface-waste water from all sources.

A modification of, or rather improvement upon the separate system, as hitherto practiced, has recently been invented under the name of the—

"*West*" system—that which is now constructing at Atlantic City and Coney Island. It is essentially a small pipe system, adapted to the carriage of excreta and house-water exclusively. It begins with a large well sunk to a proper depth, according to the estimated amount of sewage to be dealt with. This well is made thoroughly impervious to both air and water. From near the bottom of the well the main sewer ascends toward the surface with a gradient of not less than ten feet to the mile. With this main all necessary laterals and branches with co-ordinate gradient unite. All corners or turns are made with a bend and a V, so that there

is no chance for any excrement to lodge, but to run smoothly to the well. The diameter of the pipes runs from six-inch, which is used for connections, to twenty-four inch, which is used for the main sewers. The pipes being small, at all times nearly full, and having sufficient incline, the sewage runs with great rapidity, carrying everything before it; and being at once pumped from the well before putrefaction sets in, there can be no sewer gas. Besides, all house connections are continued to the top of the house and a few feet above, as a means of ventilation, and to keep all smell from the house.

In the well one or two powerful pumps are placed, of sufficient capacity to raise and force 1,000 or 2,000 gallons of sewage per minute upon filtering beds located at places devoid of possible nuisance. Here the liquid sewage is at once filtered through a mass of deodorizing and antiseptic material, and discharged into the sea or a water-course; or, if this delivery be objectionable or unavailable—as in inland towns—the filtered liquid is utilized for agricultural purposes, by irrigation; meanwhile the suspended matters are simultaneously converted into "bromo guano," and made merchantable to farmers.

While this system has special advantages for small towns, where storm-waters can be taken care of on the surface, it is also adaptable, by multiplication of centres of operation, to even the largest cities, in conjunction with a storm-water system, or to those cities which have dangerous systems fit for storm-water only, and to which they should be diverted; and to outlying districts of cities already sewered, not easily accessible by other means, except at great cost.

Moreover, in cities only partially sewered, or where more expensive and less efficient sewerage has been undertaken and suspended, sewers already laid—with a gradient of not less than ten feet to the mile—may be utilized in the adoption of this system in the interest of public health, efficiency, speedy completion and economy.

Shone's *Pneumatic* system, by means of *sewage ejectors* operated by engine-power to force the sewage through pipes over rising ground, has found favorable application in some English cities. It is more economical than deep cuts, and applicable as a remedy in overcoming the sluggish flow in sewers with insufficient gradient. For operation on a large scale, it

contemplates the discharge of the sewage by gravitation into large collection stations, similar to the wells in the West system, according to the size and contour of the town. Into these the *ejectors* are placed, and the sewage forced to the outlet. This system evidently possesses some advantages, but as compared with the West system, it is more complicated, more costly, and less complete.

The Lieurner *Pneumatic* system is a still more complicated method, which has met with favor in a few Dutch cities. It comprehends air-tight iron tanks under the streets, connected by means of iron pipes with water closets of special construction, and is operated by a powerful steam-power air pump. It pretends to deal with excreta *only*—a limitation which virtually excludes it from general adoption or favorable consideration. It fulfills no condition which cannot be more economically and effectually conducted by other means sufficiently described.*

Of the rest—the various pail, bucket and earth systems, for small towns, little need be said. They are greatly inferior to the "West" system, for manifest reasons. They make no provision for the disposal of kitchen-sink and other waste waters of the household, scarcely less dangerous than excreta, and of which the amount is rarely less than twenty gallons daily for every household. The dry earth system, to take care of fæces and urine alone, requires at least four pounds of dry earth or ashes daily for every individual—an amount which renders the system burthensome even for schools and public institutions, and for towns wholly impracticable. Besides, all these makeshifts are based upon the dangerous principle that excrementitious matters may be retained about the premises, provided they are deodorized, subject to convenience for removal—based upon the fallacy that deodorization and disinfection mean the same thing. That dry earth speedily deodorizes excrementitious matter is common knowledge, but there is no evidence whatever that it disinfects it. On the contrary, it is well known that earth thus surcharged, on becoming moist is offensive in consequence of the putrefaction which is then set up, leaving the inference pretty clear that, even when dry,

* For description of this system in detail—illustrated—see THE SANITARIAN, vol. VII., p. 396, *et seq.*

material which it has deprived of odor may be, notwithstanding, in the highest degree infectious. Indeed, some of the most malignant of infectious diseases, cholera for example, are spread with the greatest facility when the material holding the seeds or germs is in a perfectly dry state. This is probably equally true with regard to typhoid fever and diphtheria.

Safety in the use of the dry earth system, essentially consists in the same practice as the "West" system: the prompt disposal of the material (the earth) which retains the excreta, before putrefaction takes place. Distributed in the soil the gaseous emanations and soluble parts suitable for plant food are thus effectually disposed of, and the residue returned to its original elements by the process of oxidation. The cardinal doctrine of all systems should be

Ultimate removal before putrefaction—this is the danger signal, but, unfortunately, not always easily discernible; consequently, any system which fosters it, requires the utmost degree of watchfulness.

Of the various means adopted for the storage of excreta, or for its removal from one place to another out of sight and smell, from time to time, to enumerate them is to condemn them. Everybody knows the danger of food and drink poisoned with excrementitious matter. Loaded cesspools and privy vaults, as ordinarily constructed, in proximity to wells, springs and dairies, are a perpetual source of such danger; and to such an extent, as to leave no room for doubt that not less than 100,000 persons are killed annually in the United States, by filth poisoning thus propagated. The only tolerable cesspool system is that which may be used in conjunction with subsoil distribution through open-jointed drain tiles. As thus adapted, with impervious walls, and both cesspools and drains sufficiently distant from the domicile and water supply, cesspools may be used with a minimum of danger. In reply to the question likely to arise: At what distance from a well would it be safe to place a privy vault or cesspool?—The greater the better; but ordinary soils have a lateral drainage area equal to five feet for every one foot of depth—that is to say: a well twenty feet deep is ordinarily the receptacle of any soluble matter in the soil water for a distance of one hundred feet in all directions. Under some circumstances—such as subsoil

currents in certain directions—the danger distance is much greater.

Of privy vaults, if they *must* be used, it will suffice to say the walls should be made impervious, and disinfectants so freely used as to prevent putrefaction during the intervals—which should never be long—between removals of contents, and excavators used for emptying them. To render the walls of cesspools and vaults impervious, the inner courses of brick should be laid up with tongs—each brick being dipped into a boiling hot mixture of coal tar and asphalt. But for the single domicile, a better way is not to have a vault, but a tight box or pail, to use dry earth or ashes as a deodorant, and the same care in regard to prompt removal as required for the earth closet.

CANNING HOUSES AND THEIR RELATION TO THE PUBLIC HEALTH.*

By W. Stump Forwood, M.D., of Darlington, Md.

The modern term "*canning*" signifies that process by which fruits and vegetables are preserved in tin vessels, called cans, rendered air-tight by solder after the expulsion of the air has been effected by means of heat, thus preserving these articles of food in nearly their natural state for an indefinite period of time.

This industry has been developed within a few years, having its origin in Harford County, beginning upon a very small scale. It was first introduced, we believe, by Mr. Baker, who began business by the use of an ordinary cook stove. He has since erected several canning factories, that are operated by steam boilers upon a very large scale. And to supply material for their operation he annually cultivates several hundred acres of sugar corn—confining his business to the canning of corn.

From Mr. Baker's small beginning years ago, the business has increased until the present year, 1883, when it is estimated there are 500 canneries in operation in Harford County.

* Abstract of paper read before the Maryland State Sanitary Convention, Baltimore, Md., November 27, 1883, and published by permission of Maryland State Board of Health, from advanced sheets of forthcoming Annual Report.

These preliminary statements regarding the origin and progress of the canning industry in our county are designed simply for the purpose of drawing your attention to the supposed pathological conditions to which canning factories give rise. The word "supposed," in this connection, is used advisedly, for investigations into the subject, thus far, have not been sufficiently accurate or positive in results to warrant us in assuming an absolute connection between cause and effect.

While peaches, apples, blackberries, green peas, beans, and more especially sugar-corn, are largely canned, the canning of *tomatoes* constitutes the chief staple of the industry in Harford County; and it is to the offensive effluvia arising from the offal of these articles that the origin of various diseases has been attributed.

The first canning houses were started in the vicinity of Aberdeen and Perryman's, and are more numerous in those neighborhoods at the present time than in other parts of the county. And it was in near proximity to these canneries where exceedingly offensive odors prevailed, and chiefly among those employed in conducting them, that a fearful epidemic of a lingering, malignant fever arose early in the autumn of 1881, and continued its ravages with great fatality until the supervention of the freezing weather of the ensuing winter.

So many good and well-known citizens were stricken with the disease in the vicinity of the canneries—and in some instances their entire families were likewise attacked—that a widespread alarm was occasioned throughout that section of the county. So far as we can learn from subsequent investigation, the majority of the cases thus occurring were enteric or typhoid fever; but, owing to the fact that the majority of the cases prevailed in the immediate vicinity of the canning factories, it soon became to be known throughout the county, in the language of the laity, as "*Canning House Fever.*" This association of cause and effect was quite a logical inference on the part of the non-professional, when it is borne in mind that the odor arising from the decomposition of huge piles—dozens of cart loads—of tomato peelings that were allowed to ferment and decay at the doors of the canning houses. It even became a question with the medical profession, and it still has its advocates, whether this noisome material, constantly poisoning the

atmosphere, did not generate a new disease of a typhoid or malarial character; or, at least, add malignancy to those hitherto more tractable maladies.

With a view to averting a like epidemic in the following "canning" season, as well as for general protection against preventable diseases, a County Board of Health was organized at Bel Air, July 23, 1881, at which the following resolution was unanimously adopted:

"*Resolved*, That a committee, consisting of Drs. Lee, Forwood, Hayward, Kennedy and Chapman, be appointed to issue an address to the canners of Harford County, advising them in regard to the best means of disposing of the offal accumulating about their factories; and that the same be published in the county newspapers."

There were no canning houses located in the vicinity of Darlington, the place of your reporter's residence, at the time of the adoption of the foregoing resolution, and hence he could not appeal to his own observations for the information necessary for the instruction of the canners; but having been elected to the Secretaryship of the Board, and having accepted the appointment on the Committee, he felt it a duty to prosecute the necessary investigations with all possible vigor and dispatch. He strenuously appealed, verbally and by letter, to the other members of the Committee, the majority of whom were located near canneries; and also corresponded with many leading citizens in various parts of the county, who were engaged in the canning business, urging them to state the best and most practicable means, in their judgment, for disposing of the offal so as to avoid *nuisance*, as well as sickness.

These efforts in the interests of the "public good," on the part of your reporter, after the expenditure of considerable time and some money, resulted fruitlessly, as might have been anticipated; for it is a universal law that valuable labor cannot be obtained without a corresponding valuable equivalent. The State did not propose to make any compensation to the Board of Health for their labors in preserving the public health. The Secretary's efforts in procuring suitable reports from those qualified to make them, with the design of issuing an address to the canners in 1881, as to the proper disposition of their offal, having proved unavailing, the Medical Society of Harford

County, at its meeting held in Bel Air on May 8, 1882, took up the subject that had been neglected by the Board of Health the previous year, and introduced the following resolutions, offered by Dr. R. D. Lee, which were unanimously adopted :

" *Whereas*, Many of the citizens of Harford County have become alarmed, in view of the frequent sickness and great mortality which has prevailed in the immediate vicinity of canning houses, and supposed to owe its origin to the offensive exhalations from their neglected offal; and observing with increased alarm the rapid multiplication of these establishments in all parts of the county, it becomes our duty as the guardians and conservators of the public health, to investigate the conditions which are supposed to jeopardize health and comfort, and suggest their remedy or removal. Therefore be it

" *Resolved*, That the Medical Society of Harford County invite the County Board of Health, and our citizens generally, who may be connected with the canning interest, to co-operate in a joint meeting, to be held at the Court House, Bel Air, on July 31, 1882, at 11 o'clock, A. M., for the accomplishment of a common purpose, when it is hoped that the committee appointed last year will present their report upon the proper disposition of the offal matter about canneries, for the consideration and action of the said joint meeting."

It fell to the lot of the reporter to prepare the "*Address to the Canners*," which was presented to, and accepted by that meeting, held July 31, 1882. The delivery of the address was premised by the following remarks :

" In presenting the following address to the canners, the Secretary of both organizations takes occasion to say, that the member of the committee from Aberdeen, Dr. Kennedy, who has had considerable experience and opportunities for personal examination in regard to the odors and the diseases associated with canning houses, has furnished the Secretary with the substantial points which constitute the foundation facts of this report.

In fact, the report is due to his interest and energy. The other members of the committee, much to our regret, have, in essential particulars, failed to co-operate with us in supplying the materials here presented; hence, the delay in the preparation of the address.

All members of the committee, however, who have had the opportunity of examining the report, now give it their endorsement.

These details are here presented for the purpose of showing the State Sanitary Convention the impediments to be overcome in the prosecution of sanitary work without moneyed compensation. We here see that in a county, composed of citizens of wealth, and of a high grade of intelligence, where an alarming epidemic was prevailing, that it required a committee of an organized Board of Health a period of more than a year to make their report upon the best means of staying the ravages of the prevailing diseases; and that finally the report was made through the agency of the *Medical Society*—prepared at last entirely by the labors of two members of the committee of the five originally appointed for that purpose.

The special question is: "*Are Canning Factories, as at present conducted, prejudicial to the Public Health?*"

This is a question of very great importance to sanitarians generally, and to the citizens of Harford County especially; for these factories are now numerous throughout the county.

At the beginning of the present month, November, we received a letter from Dr. C. W. Chancellor, the Secretary of the State Board of Health, calling our attention to this convention and its objects, and requesting for the occasion, a presentation of our views on the "Effects of Canning Factories on the Public Health."

Feeling a deep interest in the subject, and having previously devoted considerable attention to it, we accepted the invitation; and with the view of obtaining as much information as possible, we addressed copies of the following letter and list of "Inquiries" to twelve of the medical gentlemen in the county, who we believed were located where they had the best opportunities for observing the relation between canning factories and the public health. The letter reads as follows:

"DARLINGTON, MD., Nov. 6, 1883.

DEAR DOCTOR: Dr. Chancellor, the Secretary of the 'State Sanitary Convention,' which will meet in Baltimore on the 27th and 28th of the present month, has requested your correspondent to deliver some remarks before that body upon the 'Effects of Canning Factories on the Public Health.'

As the value of my statements to sanitarians will depend entirely upon their accuracy, I have determined, for purposes of corroboration, to ask you and a few other physicians in the county, who have had opportunities for observing the various types of disease that have prevailed in the vicinity of canning houses, and which were apparently modified by the effluvia arising therefrom, to favor me with your views in connection with the accompanying interrogations. * * *

Very truly, yours,

W. STUMP FORWOOD."

The following are the "Inquiries as to the Effects of Decomposition of Canning-House Offal upon the Public Health," which accompanied the foregoing letter:

1. Have any cases of diseases been brought to your notice, which, in your judgment, originated from, or were aggravated by, the *effluvia* arising from the decomposition of neglected vegetable matter in and about canneries? If so, please state the *nature* of the disease; and whether, in your opinion, it *originated* in canning-house effluvia, or simply derived increased virulence from its agency.

2. If you have observed types of disease which appeared to be associated with canneries, and popularly known as "Canning-House Fevers," please say what peculiarities have characterized their symptoms, course and pathology.

3. Please state if enteric fever, dysentery, or any other disease, has prevailed in your practice to a greater extent in the vicinity of canning houses than elsewhere.

4. Should these questions be answered in the negative, please state whether, in your opinion, the decomposition of vegetable matter about canning houses exercises any appreciable influence whatever upon the health of those exposed to the emanations arising therefrom.

5. If it is believed that canning houses, as now conducted, affect injuriously the public health, please state what practical measures or precautions, in your opinion, may be successfully adopted for averting such results."

The first reply is from Dr. H. Clay Whiteford, of Darlington, who, during the season just closed, has filled the office of Inspector to thirty-one canneries. The duties of this office do not require him especially, though incidentally, to inspect can-

ning houses and their surroundings as to their *sanitary condition*, but simply to inspect the *quality of the articles canned* by an association of canners, who place their goods upon the market under a common brand.

The Inspector's duty is to see that no member of this association puts up an inferior article, and thus bring the brand of many of the most careful packers into disrepute.

Dr. Whiteford, under date of Nov. 10, 1883, says :

"DEAR DOCTOR : Yours of the 6th received and the contents carefully noted.

As we find our canning houses conducted now, I am of the opinion that they are not a special cause of disease, more than is found around any farm-house in the country, if as much. You are well aware that in and around every barn you will find a yard for deposit of stable manure of various animals ; a pig-pen with its proportion of abominable filth ; the chicken-house; the out-of-door water-closet, etc. All of these places of deposit are ten-fold more at fault than the canning house. The owners of those places do not, except rarely, take any precautions against the foul stench arising therefrom. A few will throw some lime or plaster around ; the majority neglect them entirely.

During the past packing season, it has been my duty as Inspector, to look after the quality of goods and the general cleanliness of thirty-one canning houses. While in this line of duty I have always kept before me the health of the people in and about the canneries, and I have found that the district over which I have traveled was singularly healthy, and has so remained up to this time. Surely, if the canning houses were a source of disease, and to such an extent as they have credit for being, we could not possibly have enjoyed such good health in the past season.

During the summer of 1880 there was but one canning house in this neighborhood; and I never during my professional career here—since 1869—had half as many cases of malaria and diseases of the same type, claimed by some to be the result of canning houses, as were presented in that season. Now, clearly, these cases were not the result of canning houses. If so, why should we have had such good health this year, when we have at least twenty-five of these factories within four miles

of us? All this noise, that we have heard so much of, is thunder in the distance, only. The alarm is false, and there is no doubt about it, the facts prove it. As sanitarians, we would do most good by giving more attention to the depositories of decayed matter in and around each homestead, as referred to above, than to be charging all our troubles on the packing houses, which only run about forty or fifty days in the three hundred and sixty-five.

But, dear doctor, do not understand me as excusing the canning houses from their full share of cause; they must take some of the responsibility.

Just at this moment a few cases in point come to my mind. During the season of 1881, A. S. and R. M. began work in Whiteford and Hopkins' canning house. They were in poor physical condition, and both went on duty with *ague*. They worked hard night and day during the season, and without any medicine; one gained 19 lbs., and the other 24 lbs. in weight, and went home at the end of the season *entirely well*. Again this house employed foreign help, just from the lower counties of this State, where they had been engaged in picking strawberries. Several of them had had malarial fever. * * * These people lived and slept throughout the season within two hundred feet of the packing house.

In closing these remarks allow me to suggest that the constant volume of heated air, arising from "process kettles," etc., may have a tendency to counteract, or dissipate, any evil gases that arise from decayed matter, as result from tomato peelings, corn husks, etc. This is only conjecture; but why the impunity, if there is a *cause* and that cause *inert?*

Very truly,

H. CLAY WHITEFORD, M.D.

The following is the answer made to our queries by Dr. P. Chapman, of Perrymans:

"PERRYMANS, HARFORD CO., Md., Nov., 18, 1883.

MY DEAR SIR: Your favor of the 6th inst. was duly received; and in reply I will state that I have given some thought to the subject of canneries, and the diseases arising therefrom, and have come to the conclusion that many of our good citizens have gone to early graves in consequence of the *effluvia from canneries*. I believe they create the germ of *typical typhoid*

or *enteric fever*. We have had, in my experience here of seven years, what Woodward and Flint term typho-malarial fever in the beginning; and as canneries increase I find they are intensifying the typho into a genuine typhoid fever. I have seen several in a family stricken down, and from no other cause, as far as I could learn, but the bad management of canning houses. Therefore I would suggest for the good of those engaged in the business, and for the good of their neighbors, that our representatives in the next Legislature see that special legislation is enacted to prevent the evil arising from the same."

Dr. Chapman then proceeds to answer the questions *seriatim* as follows:

"1. I am not prepared to say whether the typhoid germ originates directly *de novo* from any peculiar aspect given it by the microscope, from canneries. I am not a believer, to the full extent, in the assured germ, humoral or any other theory, as a specific cause of disease; but believe that the virulency of all diseases is increased in ratio with the intensity or multiplicity of *micrococci* or *bacteria* evolved from decaying animal or vegetable matter, sometimes resulting, from influences unknown, in contagious diseases; at one time in typhoid, at another in diphtheria, and at others in scarlet fever, etc.

2. We have here a 'canning house fever,' which shows violent poison, to be eliminated either from the bowels, by copious grumous hemorrhage—pre-eminently hemorrhagic in its character—nose, throat, and I might add *the skin*, in the order named, showing the essentials of blood-poisoning. I have had no post-mortem.

3. I certainly believe that *enteric* and *dysenteric* troubles are closely connected with canneries; and that the hemorrhagic type prevails especially in tomato canneries.

4. I think they do; though this question has been answered in the above; and the next session of the Legislature should not adjourn without having passed *special nuisance laws*, protecting innocent citizens against the more careless ones who are indifferent to their own welfare, and care less for that of their neighbors.

5. I now answer your last and most important question. I believe that the vast majority of our citizens engaged in canning are ready to act upon wise counsel; but some are thought-

less; others are ignorant of the sanitary precautions necessary to preserve themselves and neighbors from the injurious consequences of badly-kept canneries; and others—but few, it is to be hoped—care nothing for their own health and lives, or that of their fellow-citizens, so they themselves prosper in their business. I would therefore repeat that the next Legislature should pass stringent laws regulating the canning business, a matter that concerns us all; certainly all in my section of the county. The law should be executed by *paid officers*, a physician in each neighborhood should be appointed, whose duty it would be to inspect each and every cannery at least once weekly during the eight or ten weeks—from August 15th to October 30th—which constitute the canning season; with power to impose a special fine in case his rules are disregarded. And the magistrate should be empowered with authority to have the arrest made, and require the offender to pay the fine directly, without the delay which usually attends the formalities of the law and the courts.

The sooner our people are brought to see the necessity of some legislation regulating this important and growing enterprise in our midst, the better will it be for their future health and welfare.

Truly and respectfully yours,

P. CHAPMAN, M.D."

Dr. W. W. Hopkins, of Havre de Grace, takes the opposite view.

"HAVRE DE GRACE, November 9, 1883.

DEAR DOCTOR: Yours of the 8th, making inquiry of me in regard to the deleterious effects of canning house offal, if any, upon the community in which I live and practice, must be answered by my saying that such is not my observation nor belief that it has had other bad effect than that of being offensive to our sense of smell, when they are located in close proximity to the public roads. I am not inclined to the belief that decomposed vegetable matter will produce disease. We will have to search for the germ where most authorities think it is to be found, viz.: in cesspools, sewers, drains, etc.

To produce enteric fever, whether such places must be further poisoned by having the specific germ—the dejections of a patient suffering with the disease—poured into them, may be

questioned, doubtless; but the proof that such is the case is strong. I sometimes think that to accuse the decomposition of vegetable matter of being a source of disease, is to imply that Providence made a mistake; as it is something that we could not be expected to get rid of. It always will be around and about us; we cannot run from it, nor drive it from us.

The fever that prevailed with us in 1881, frequently termed 'canning-house fever,' resembling, if not true typhoid fever, would certainly, to some extent at least, have prevailed in the last two years, had canning houses been the cause.

Yours truly,

WM. W. HOPKINS."

As to the general decomposition of vegetable matter in nature, as referred to by Dr. Hopkins, as an evidence of its innocuousness, the analogy is not a correct one; for nature never disposes watery fruits, like tomatoes, in large masses, as are seen about canneries, where their fermentation would be offensive to the olfactories.

These heaps of offensive materials result not from nature, but from the artifice of man.

Dr. Scarboro, of Dublin, writes:

"NOV. 18, 1883.

DEAR DOCTOR: In answer to inquiries, I must say that, very contrary to what I should have expected, I have never yet been able to trace any case of any kind of sickness to canning-house influence.

On the contrary, the negative testimony has all been the other way. I have known several instances where the canning houses were exceedingly offensive, and yet there was not a case of sickness anywhere in the vicinity more than usually occur.

Many persons supposed that the malignant cases of malarial fever in the Galbreath family, two years ago, was caused by the canning house. But this could not have been, for the fever began before they had commenced canning; and the cannery was half a mile from the dwelling, with higher land intervening. What the cause was, I do not know, but five persons who boarded in the house took the fever, while those who worked at the cannery, and boarded elsewhere, were exempt.

I attended two girls with dysentery in the last summer,

who had worked at canning; but I had other cases similar who had not been near any cannery.

As I said before, this is very much contrary to what I should have expected.

Now, although perhaps, rather foreign to your inquiries, I must say that I believe that malarial fever and typho-malarial fever are caused more by the water drank than any other cause.

A few years since, a very severe type of typho-malarial fever broke out at J. B. Scarboro's.

His wife had it, and she insisted, from the first, that it was the *water* that caused her sickness. On taking the water out of the well, it was found to be in a very foul condition, there being several dead toads and rats in the well.

But, with all this, I think that strict regulations should be enforced in regard to the cleanliness of the canning houses; for, while it may not be possible to prove them to be the cause of sickness, they are in many cases a positive nuisance, and most offensive to their neighbors, and really to the traveling public.

Very truly yours, etc.,

SILAS SCARBORO."

Feeling anxious to obtain all the information possible on this subject, we introduced it to the meeting of the Medical Society of Harford County, held on the 13th of the present month.

The remarks made on that occasion by Dr. J. T. Payne, who resides in the northern part of the county, were clear and practical. He said that, previous to his personal experience, he had been prejudiced against canning houses for sanitary reasons; but, two years ago, before there was a canning house within five miles of his residence, a malignant type of low fever appeared, and pervaded the neighborhood generally, with very fatal results.

But there were no canning factories there then to take the blame. Since that year, a number of canneries have been erected and operated in the same neighborhood, and yet no epidemic of any kind has since appeared. He had not seen any case of disease that he could attribute to canning house infection; but he strongly protested against the discomfort they occasioned the public through their offensive odors, and favored legislation for their abatement.

Not having any transcript of Dr. Payne's remarks, we have simply stated, in our own language, the chief points of his argument.

Dr. R. D. Lee, of Bel Air, remarked: "I am convinced, from careful observation, that the effluvium arising from the decay of vegetable refuse from canning houses, during the summer and autumn, by infecting the air, is a fruitful source of disease—diphtheria, dysentery, diarrhœa, etc.—and a decided aggravation of fevers peculiar to paludal districts; tending to convert the simple autumnal intermittent into a remittent, or continued fever, so well marked and characteristic as to acquire the name of typho-malarial, or "canning house fever," among the physicians practicing in the belt of our county bordering on the bay and tributaries.

Diphtheria, especially, has been frequent and violent wherever the canning houses have been numerously aggregated, and proper cleanliness neglected.

We say this without prejudice; on the contrary, we are justly proud of our great industry, of which our county has been the great pioneer.

There is a general complaint of the noxious gases emanating from these places; and the residents are anxious to have the nuisance abated."

Almost at the last moment, November 22, we received a reply from Dr. J. H. Kennedy, of Aberdeen. As before stated in connection with Dr. Chapman's remarks, the views of Dr. Kennedy, who has also lived in the midst of the earliest and the most thickly located canneries, from their origin to the present day, are entitled to great weight; for his opportunities for observation have, perhaps, been better than those of any other practitioner in the county.

Dr. Kennedy replies to our queries as follows:

"1. A number of cases have come under my notice, which were apparently due to the effects of canning house effluvia; and many other cases were more or less modified by the same cause. As to the former class, they were principally typhoid; and a few cases of a peculiar kind of unclassified fever, which I suppose might have been designated as "*canning-house fever.*"

Those which seemed to be only influenced by the poison

atmosphere of canning houses were persons who suffered attacks of intermittent and remittent fevers only while exposed, and were curable only after having withdrawn from the source of infection.

2. These cases referred to above as being unclassified, or canning-house-fever, differed from typhoid in many respects.

For instance, the suddenness of onset and rise of temperature to 105° by the fifth day; and by the gradual or modified decline to normal, or below, by the seventh day. There was no diarrhœa, tympanitis, or eruption; nor dry, black, or fissured tongue.

A case in point, which I saw October 19, 1883, for the first time, was ushered in by a slight chill; with moist, coated tongue, constipated bowels, with intense pain in the head, the stomach and upper portion of the body generally—temperature, 102°, and which continued to rise until the 24th, when it reached 105°; after which, by the eighth day, it fell to 95°. The intense suffering, which was out of proportion to the symptoms, continued, and was of a nervous character, first in the stomach, then in the chest; and the head and spinal column would be successively affected; no vomiting; tongue clean and fiery red; delirium constant. No periodicity. Quinine useless. The temperature did not reach the normal point until the thirtieth day of the disease, when recovery slowly began taking place. The countenance was most haggard, and the complexion was of a ghastly hue throughout.

I will sum up as follows: I have not changed my opinion, formed from the epidemic of 1881, and expressed in our address to the canners, although canning houses have increased in number, and cases of typhoid and other fevers have been fewer.

The people in this portion of Harford County were thoroughly aroused by the epidemic of 1881, and very many of them have removed the greater portion of the offal from their canning houses, and instituted measures of purification, which, though defective, and poorly enough carried out, have done wonders, as the olfactories of all exposed can attest. And again, we have not had a crop of fruit in either year since 1881, that offered such an amount of refuse matter around canning houses for putrefaction. Nor has there been in either year since then such continued elevation of temperature, favoring decomposi-

tion, as was maintained throughout that very long and very hot season.

In conclusion, I do most defiantly maintain that the poisonous, *villainous odor* of a *filthy canning house* is lowering to vitality; and no more likely site could be found for discovering the germs of disease. I have never observed such cases of fever as I have described in malarious or other localities remote from canning houses. I have noted few or no cases of special disease about or connected with the houses that can corn exclusively, where the husks and cobs are removed, in which cases no unpleasant odor arises.

When the winter is at all mild, as regards temperature, the heaps of tomato offal, frequently left about canning houses, emit their sickening odors throughout that season; and upon the opening of spring this filth acquires a new activity of offensiveness from the warm rays of the sun; and from some of the canning houses a disagreeable smell is distinctly perceptible throughout the year."

We have now given the "pros" and the "cons" of this question at considerable length.

And it will be seen that the gentlemen consulted differ materially and radically upon the main question, viz.: Do canning houses produce or aggravate disease?

As far as our personal observation goes, we do not feel warranted in attributing special diseases to canning houses. In the year 1881 we had charge of more cases of enteric fever than ever before in a single year, during thirty years' practice. The majority of these cases were remote from, and beyond the influence of canneries. Within the two years that have since elapsed, at least twenty-five canneries have been erected within the circle comprising the bounds of the cases occurring in 1881; and yet not a single case of enteric fever or of any other disease that could be charged to canning houses has, during those two years, come under our notice.

Our correspondents, though perhaps not "known to fame," are all physicians of ability and experience, who are well known and highly respected in Harford County, where they possess the warm esteem and confidence of the large communities in which they respectively practice their profession; and while differing as to the etiology of disease, they all unite in *condemning the*

nuisance resulting from the decomposition of the offal about canneries, which destroys the comfort of those who reside in the vicinity, and of those who travel the public roads.

They all suggest legislation for the abatement of this nuisance; and in this suggestion we unite most heartily. The outcry of our citizens generally against these insufferable odors is too loud and too unmistakably earnest to pass unheeded longer. Some positive steps for its suppression must be taken at once. And it now becomes the duty of this body to institute the proper initiatory proceedings for submission to the action of the approaching session of the Legislature. To give a single instance from a non-professional source, to show the feelings of the people upon the subject of this nuisance, we transcribe the following letter, just received from a gentleman, while writing upon the subject he speaks of:

"WEBSTER, Md., November 22, 1883.

DEAR SIR: Seeing by the newspapers that you are to deliver an address before the State Board of Health, and knowing you are a friend to suffering humanity wherever found, and that you have the health of the public at heart, we beg you to pay a visit to the canning house of Evan Thompson. Said canning house is situated on the public highway, about one hundred and fifty yards from my dwelling, and about thirty feet from my spring-house. During every rain the filth backs into my spring-house, and I am unable to use the water for weeks; in fact, we have not used the water for drinking purposes, all summer.

Hoping to see you here soon, I am

Yours respectfully,

G. W. PAUL."

This letter needs no comment, further than to say that it is the echo of views entertained by hundreds of others.

Legislation is required to compel the canners to exercise scrupulous care in the immediate removal of the offal from the canneries by water-tight carts to receive it, without allowing a particle or a drop of the liquid to fall upon the ground about the establishment. It is essential, for the avoidance of odor, that all of the offal should be carried away, and scattered broadcast upon the fields of the adjoining farms, where the sun dries and harmlessly dissipates the moisture from the substances,

and the residue afterwards unites fertility to the soil, and thus repays the labor of removal.

But it is useless to adopt laws without providing the means for their execution. Sanitarians, who render efficient service, must be paid for the same. Physicians, qualified for the duties of inspecting canning houses, and directing remedies for existing nuisances, and advising the best means for avoiding the same, can not, and will not leave their private practice, from which they derive their support, for the labors of a *public* office which they are asked to fill "without money and without price." However self-sacrificing human nature may have been in ancient times, their present necessities in the struggle for existence compels them to look for the *quid pro quo.*

It is the duty of the State to provide for the protection of the lives and the property of its citizens; and all who are interested in sanitary legislation—and who are not?—should unite in impressing upon our legislators, at the very beginning of the approaching session, the importance, yea, *the necessity*, of providing an ample fund, to be appropriated to the remuneration of those sanitary workers for the benefit of the State, in due proportion to the value of the services required and rendered. Until this is done, boards of health will only exist, if at all, in name.

In the purely sanitary consideration of this subject, it is only necessary to ascertain to what extent pure air may be admixed with extremely offensive odors, containing nitrogen and sulphuretted hydrogen, and inhaled habitually without inducing deleterious effects upon the health. And we must bear in mind that the sense of smell, like that of taste, and the other senses, is a sentinel that stands to guard the system against the assaults of invisible foes.

If it can be proven that animal life may be maintained indefinitely in such an atmosphere—the ordinary canning-house atmosphere—the next question that logically presents itself is: What right has any man, or number of men, for purely selfish purposes, to so befoul with irrespirable stench the pure air of heaven, as to destroy the pleasure and comfort of his fellowmen—depriving them of that one blessing which we have always been taught to believe was designed to be "free, alike to the rich and the poor"? Upon this point we ask your most

serious consideration. As we said before, while we are not prepared to prove this decaying vegetable matter to be a factor of disease, *we unhesitatingly declare that canning houses, as now conducted, are unmitigated nuisances!*

THE TYPHOID FEVER OF AMERICA—ITS NATURE, CAUSES, AND PREVENTION.

By R. J. FARQUHARSON, A.M., M.D., Secretary of Iowa State Board of Health. Read at the meeting of the Iowa State Board of Health, Des Moines, November 2, 1883, and by the Board ordered to be printed.

At the last meeting of the Board the Secretary was instructed to prepare for general distribution, a circular upon the cause and prevention of typhoid fever. Such a circular was not prepared, for the following reasons:

In compiling the causes of death in this State I was led to observe the resemblance in many particulars between the periodic or malarial fevers (ague, remittent, and typho-malarial), and the so-called typhoid fevers. Pursuing the matter further, I have arrived at the conclusion that our typhoid fever differs etiologically, at least, if not otherwise, from the typhoid fever of the English counties, the fæcal fever of Budd, and the pythogenic fever of Murchison.

The classification and nomenclature of continued fevers have always been among the prominent of the *approbia medicorum.* Putrid, nervous, jail, ship, synochus, typhus, etc., were the various names given to continued fevers; typhus-abdominalis being the term used to designate typhoid fever, and one yet used by some European writers.

The identification of typhoid; its separation from typhus, of which it was heretofore considered a variety; its establishment as a specific disease, was made by Louis, of Paris. English writers are apt to give the credit of this discovery to their own countrymen, especially to Sir William Jenner, the results of whose researches were published from 1849 to 1851; stating that although Louis studied and pointed out the morbid appearances in the intestines as an important and distinguishing

mark, yet he still confused typhus and typhoid. (Blyth's Dictionary of Hygiene, Art. Typhoid Fever.)

Now, from 1842 to 1845, during my period of study in Philadelphia, I often heard Dr. Gerhard, a pupil of Louis, point out the distinguishing characteristics of these two diseases, in no wise confounding or comparing them, but demonstrating both clinically and anatomically their essential difference. At the Pennsylvania Hospital I saw, under Dr. Pepper, some cases of typhus, or ship-fever, in the persons of immigrants, and during a term of service as interne at the Philadelphia Hospital Blockly during 1844 and 1845, I saw many cases of typhoid fever, studied them clinically and anatomically, and am confident that neither in the minds of the lecturer, Dr. Gerhard, nor of his hearers, was there any confusion of ideas in regard to typhus and typhoid fevers.

As you all know, Dr. Budd makes typhoid fever a specific contagious disease; in fact, an exanthematous disease, with a double eruption, one internal and the other external. The former, in the words of Dr. Budd, "standing in the same relation to it as a diagnostic mark, at least, as a peculiar eruption does to small-pox."

From these internal ulcers come the germs, which, passing out of the body with the fæces, reach others through the drinking water, or after being dried, by means of the air-passages. This narrow and exclusive theory is the one which appears to be most generally accepted by recent English authors; it certainly is the one used by sanitary authorities as the basis of any plan for the prevention of typhoid fever.

In the latest circulars the rules laid down for the prevention of typhoid fever are essentially the same as those suggested by Dr. Budd in his work on that disease in 1873. I would most earnestly protest against the assumption that the principles which underlie these rules are applicable to the typhoid fever of this country, and shall endeavor to show that it is an assumption which, if not altogether groundless, is, at least, opposed to the great bulk of evidence on the subject.

The first assumption is in the statement that typhoid fever is contagious.

My own experience is opposed to this idea; neither in hospital practice in Philadelphia, in 1844–45 ; in New Orleans, in

1845–46; in the United States Navy, in 1846–55; in Nashville, during the war, 1862–65; nor in private practice, did I ever see anything like contagion, or any means of prevention used. Nor is this experience, though limited, at all singular. Dr. Murchison, of the London Fever Hospital, says:

"In nine years, we treated in the London Fever Hospital, 3,555 cases of enteric fever in the same wards, with 5,144 patients not suffering from any specific fever. Not a single case of enteric fever occurred among the patients suffering from other maladies in the whole course of this time, although it was a common practice for them to use the same water-closets and night-stools, and the use of disinfectants was exceptional."

Liebermiester says:

"Up to 1865, in the number of hospitals visited by me, I have never seen a single patient, nurse, or physician attacked by enteric fever, although such cases were in the general wards." (Zemssen's Cycl., Vol. I., p. 46.)

Compare this with the contagion of typhus.

"In Ireland, in 1847, no less than 500 medical men, about one-fifth of the entire number, suffered from typhus, and of these 127 died." (Op. Cit., Vol. I., p. 48.)

Dr. Drake, in "Diseases of the Mississippi Valley," part II., p. 431, speaking of the Irish-immigrant fever (the true typhus), says:

"The physicians, students, apothecaries, clergymen, nurses, and all other attendants on this Island (Grosse Isle), amounted to 328, of whom no less than 184, or more than one-half, contracted the fever."

In this country, Dr. Cabell's paper on the "Etiology of Enteric Fever," read before the section of Public Hygiene and State Medicine of the American Medical Association in 1877, was the earliest protest against the specific nature and origin of typhoid fever. The last Annual Report of the State Board of Health of Kentucky (1883), contains a very able paper by the President of that board, Dr. Pinckney Thompson, on this subject. In this paper the author says:

"As I study the literature of the etiology of typhoid fever, coupled with an experience in the practice of medicine for thirty years, I am forced to the conclusion that typhoid fever does originate from other causes than the contagion of a previous case."

Dr. Thompson says that typhoid fever is the greatest scourge to which *farmers* are subjected. He gives numerous instances of the spontaneous origin of the disease, and these, in a sparsely settled country, where previous cases would not by any possibility escape detection. He also quotes approvingly from the Reports of the Massachusetts Board of Health the account of the production of typhoid fever from the drying of a mill pond, and the conclusion of that Board that typhoid fever might be produced in three ways: 1. By foul water. 2. By foul air. 3. By emanations from the earth, occurring most frequently in the autumn and seasons of drought, (*i. e.*, by malaria). Dr. Thompson has no doubt of the origin of typhoid fever from decayed wood, and gives the following pregnant instance: A small army (Confederate) was encamped at Valley Mountain, Randolph County, West Virginia. Two regiments occupied all of the cleared land, while the rest of the command had to encamp in an adjoining forest. In the so-called cleared land, the trees had been belted, and had for years been slowly rotting. Many of them in various stages of decay bestrewed the ground. Thirty per cent. of one of the regiments on that cleared ground and twenty-five of the other had typhoid fever, while of those camped in the forest not more than five per cent. were attacked. They all had substantially the same water and food, and the fever commenced its ravages before there was time for soil contamination.

The so-called mountain fever, the scourge of the trapper, and of the pioneer miners of the Rocky Mountains, is a crucial example, as it were, of a typhoid fever, with the characteristic intestinal lesion and other marks, produced by malaria—or rather by the aqua-malaria (Smart), and without the remotest possibility of the intervention of a previous case (Budd), or of any animal matter in a putrescent condition, fæcal or otherwise (Murchison).

Descriptions of this form of typhoid fever are given in the American Journal of Medical Sciences, by Drs. Smart and Hoff, and the former has also published analyses of the water in those elevated regions, whose contamination by vegetable matter is the undoubted cause of the disease.

"Malaria is undoubtedly the cause of mountain fever, and equally certain is it, that this malaria accompanies the vege-

table matters washed down from the atmospheric by the rain and snow fall." (Smart in Buck's Hygiene, Vol. 2, "Hygiene of Camps.")

Drake in Diseases of the Mississippi Valley, part 2, p. 374, describes a mountain fever which prevailed in the Alpine region of Buncombe County, North Carolina, with primitive rocks (granite, gneiss, or mica-slate), and pure (?) soft water. He says:

"Those cases constitute, so to speak, a connecting link between the periodical and typhus fevers. They are the true mountain fever, sporadic at almost any season of the year, and sometimes prevailing to a semi-epidemic degree in the autumn and early winter. They are more rife from August to November, inclusive, than at any other time."

In this connection, *i. e.*, in regard to the proper status of the typhoid fever of America, I cannot resist the temptation of making the following rather long quotation from the learned author of the Diseases of the Mississippi Valley, its peculiar appropriateness being my excuse. He says (Diseases of the Mississippi Valley, part 2, p. 441):

"In the preceding chapters, I have presented, with as much brevity as possible, a history of the principal visitations of continued fever which our Interior Valley has suffered. I propose now to generalize the parts which they embody, and incorporate with them such additional observations furnished by other countries, as may supply deficiencies, and assist in establishing correct general conclusions. The foreign will then be engrafted on the native shoot, not substituted for it, but still preserve so much of its individuality as to be distinguishable.

"This continued recognition of our *own* facts is obviously an important duty, for they are to be relied on, not because they have been more correctly observed and recorded, for such is not the case, but because they apply with absolute certainty to our own diseases, while those of distant countries may or may not have that applicability.

"In treating of our periodical and yellow fevers, this union of the exotic with the indigenous was not required; for those fevers prevail to such an extent as to supply equivalent facts for all that have been observed elsewhere. *Should our continued fevers become more prevalent with the age of our settlements, the time will arrive when their etiological, pathological and therapeutic history may be written in completeness without borrowing from other countries.*"

In my opinion, and, doubtless, in that of many others, that time has arrived. The increase of typhoid fever, coincident with a decrease of periodic or malarial fevers, which has taken place in many parts of this country, has led to the formation of an opinion that there was some antagonism or opposition between their causes; but this phenomenon would be just as readily and logically explained by a theory of a kindred, if not an identical, origin.

In the introduction to Buck's Hygiene (p. 28), Dr. Billings, U. S. A., says:

"The conclusion of Dr. Cabell, from the facts collected by him, appears perfectly legitimate, viz.: That it appears that at various times a fever, having the clinical characteristics of the typhoid-enteric fever, has prevailed in large areas of country in Virginia, generally succeeding a like prevalence of periodic fever, which in a great degree subsides on the appearance of the typhoid affliction, and he concludes that this disease cannot be prevented in these districts by exclusive attention to the removal of the products of either animal or vegetable decomposition."

Similar evidence comes from Massachusetts, where malarious or periodic fevers have not been much known until within a few years past. In the Second Annual Report of the Massachusetts State Board of Health (1871), will be found an exhaustive article on the "Causes of Typhoid Fever" in that State, by Dr. George Derby, Secretary of that Board. Referring to his correspondence, Dr. Derby says:

"The exposure of the bottoms of ponds and reservoirs in the season of heat and the season of decay—thus charging the air with the products of the decomposition of leaves, wood and all forms of vegetable life, mingled with whatever the soil may add to their products, or changed as the soil seems to have power to change them, is, of all others, the most frequent single cause assigned for the production of typhoid fever in Massachusetts.

"Letters from correspondents in twenty-one towns assign this cause.

"But the most remarkable example of the influence of the soil, *i. e.*, the earth, in producing typhoid fever, is the following:

"The island of Martha's Vineyard has a scanty population, what is apparently homogeneous in race, habits, food and water supply, etc., yet the eastern and western parts of this

island, of nearly equal area, hold very different situations in regard to the prevalence of typhoid fever. This disease is very common in the western and scarce in the eastern portion. Now, what causes this great difference? Geologically they differ very much, the western part of the island being of the Eocene-tertiary formation, the other the Diluvium or drift formation. Topographically they differ even more.

"In the western, or typhoidal section of Martha's Vineyard there are hills and valleys with attendant vegetation in a rich surface soil overlying a stratum of clay. In the eastern, or non-typhoidal section there is a blank, level, barren expanse of sandy drift, perfectly pervious to water at all depths."

Dr. Derby closes his able essay as follows:

"Although not yet proved, it is exceedingly probable that a rich and fertile soil in which decomposable substances are retained near the surface by any cause, whether a clay subsoil or a ledge of rock, or a protracted drought, is a soil favorable to the production of this special disease."

But it is not alone in America that this inability to subscribe to a narrow and exclusive idea of the origin of typhoid fever exists. In Quain's Medical Dictionary (London, 1883), there is an article on typhoid fever, by Dr. Broadbent, in which the following significant paragraph occurs:

"It shall be added that while in this country (England) and in Europe generally, all the evidence tends unceasingly to confirm the dependence of typhoid fever on pre-existing causes, and the dissemination by drinking-water as its chief mode of propagation, observations and investigations in India appear to show either that typhoid fever can there arise independently or that there is a disease not yet distinguished from typhoid fever, which has a different method of rise and spread."

If, now we turn to the Croonian lectures on the "*Climate and Fevers of India*," delivered before the Royal College of Physicians in 1882, by Sir Joseph Fayrer, Surgeon-General, etc., we will find abundant confirmatory evidence of the truth of our assumed position in regard to the nature and cause of typhoid fever. Of all countries, India seems to afford the best field for the study of fevers.

The registered deaths from all causes in India in the year 1869 were 4,975,042, of which 3,564,035 were from fever, being 73 per cent. of the total deaths. During the same year (1849,)

the British army in India numbered 57,810 men, and of these, 51,959 suffered from fever with a mortality of 387.

In his second lecture, Dr. Fayrer remarked :

"The specific poisons which produce typhoid, enteric fever and some other diseases are probably as active in India and other tropical countries as they are here (England), but I submit that fever with Peyerian ulceration may and does occur from other causes than fæcal contamination."

In Lecture Third is given a new classification of the continued fevers in India and the Tropics, in which the most notable feature is the introduction of sun-stroke as a fever under the head of Ardent or Thermic fever. Also thus :

"Some medical officers of experience see reason to modify their views of disease after experience in India, and it is fortunate for the future of tropical pathology and medicine that they do so, as a too exclusive application of theories which are strictly appropriate here (England), will not always be so in India and the Tropics."

Dr. Fayrer gives quotations from letters of a number of experienced medical officers in India, of which the following from Dr. Morehead, author of "Researches on Diseases in India," is a type :

"You incline, if I mistake not, to the opinion that there are in India cases with the symptoms and lesions of Europan enteric fever, which cannot be traced to a fæcal cause, either in Budd's theory or Murchison's, but which must be traced to climatic or other ordinary causes. I do not dispute it."

Dr. Fayrer quotes Drs. Drake, Woodward and Dickson, of this country, as favoring his idea.

It will take up too much time to follow the evidence derived by Dr. Fayrer from all parts of the world, Ceylon, South Africa, Madeira, etc. It will suffice to state, that the burden of it all is, that typhoid fever may arise without specific or fæcal contamination. I shall close these quotations by one from letters from Prof. Leon Colin, of the Val-de-Grace (Army Medical School), a medical officer of eminence in the French army, whose experience and researches on the subject of malarial and typhoid fevers give great weight to his opinion. He says :

"A theory was advanced by M. Boudin, that intermittent and typhoid fevers were antagonistic, and that where one ex-

isted the other was absent, but it has been abundantly shown that not only in Algeria but in Italy the mortality from both has been excessive. In Algeria 4.63 per thousand men died of typhoid; 3.05 in France itself. In Algeria it caused as much mortality as intermittent. In Rome, in 1868, the French army lost the enormous number of 2.03 per 1,000 from typhoid alone.

"These facts prove that malaria confers no immunity; indeed, intermittents and typhoid appeared simultaneously in the same regiments in Algeria and Rome."

In another work (Malarial Typhoid Fever), M. Colin says:

"To sum up, the group of typhous fevers, and especially of the typhoid fevers, is separated from that of malarial (marsh, *palustres*), in a manner much less absolute than is generally admitted. Numerous facts have demonstrated how little foundation there was to the dogmatic intolerance which so often has refused credit to the observations of authors, which have demonstrated this affinity."

In the following diagram (No. 3 of the forthcoming report of the State Board), are represented for the twelve months of the year: 1. The curve of the normal temperature, from twenty years' observation. 2. The curve of typhoid fever; and, 3 The curve of the malarious fevers, the last including ague, remittent and typho-malarial fevers.

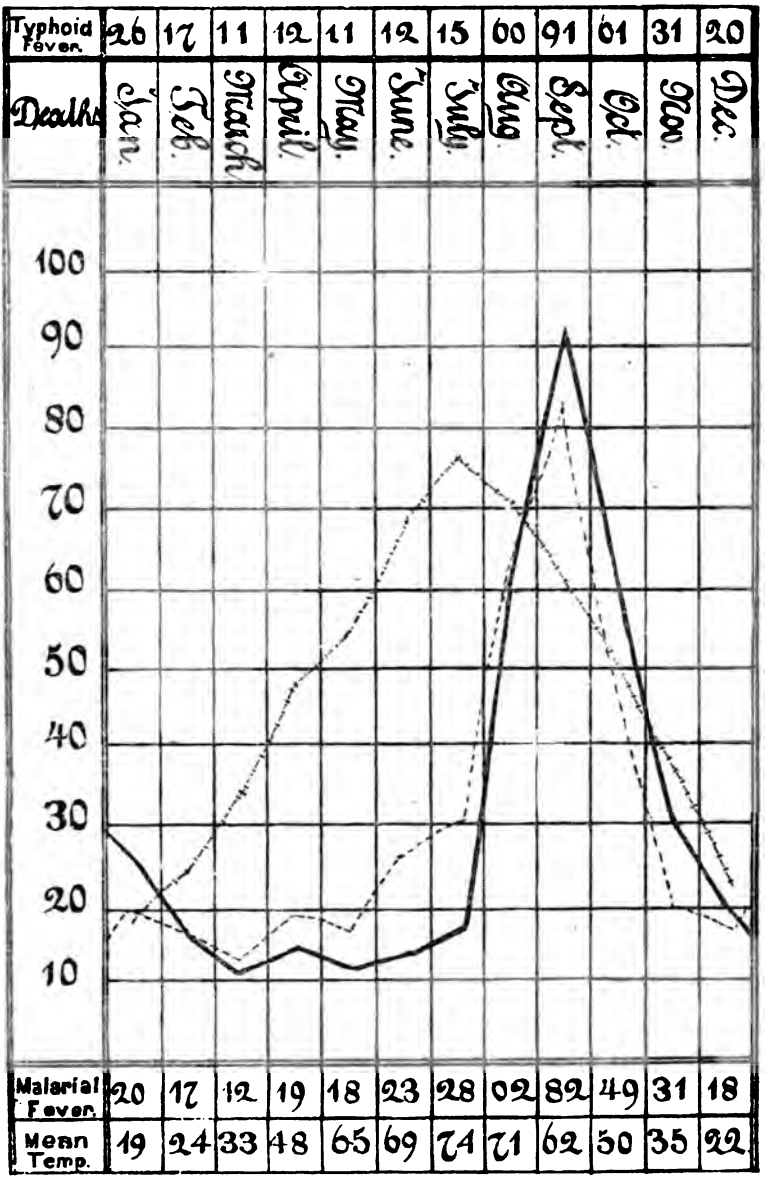
The notable points of this diagram are, not only the parallelism, but the almost absolute coincidence of the two fever curves; the parallelism of the heat and fever curves, the latter just two months behind the former; the one culminating in July and the other in September. In another diagram is shown the curve of the deaths from typhoid fever in Massachusetts for five years, 1865-69. Compare these curves of diagram No. 3, with the percentage of deaths from typhoid fever in England from 1840–56—16 years. Spring months, 23.5; summer, 23.8; autumn, 27.7; and winter, 25.6. The author, realizing that "The rate of deaths from fever is far more uniform than that from any other disease under consideration (zymotic diseases), and is far less affected by seasonal changes."—*Transactions of the Epidemiological Society of London*, 1855.

Here (Mass.) the typhoid fever curve is the same in its general course, but culminates in October, one month later than in Iowa, in September. On the large diagram are given:

DIAGRAM.*

Curves of Typhoid and Malarial Fevers. (The latter includes Ague, Remittent, and Typho-Malarial Fevers), for the year ending October 1, 1881.

The solid line designates Typhoid Fever; the dotted line, Malarial Fever; the broken line, Mean Temp. (F).



* This Diagram is a reproduction, as far as practicable, of a large one in *colors* exhibited at the time of reading.—EDITOR.

1. The curve of malarious fevers in Iowa..(deaths in 1880–81)
2. " " typhoid fever in Iowa..... " "
3. " " " " Michigan.....(deaths in 1873)
4. " " " " N. Y. City.....(deaths in 1882)
5. " " " " Mass.....(deaths in 1880)
6. " " " " Berlin.....(deaths for 18 yrs.)
7. " " " " Munich.....(cases for 16 yrs.)
8. " " " " Basle.....(cases for 24 yrs.)
9. " " " " London....(cases for 14 yrs.)
10. The curve of the soil-water in Munich.....(for 1872)
11. " " typhoid fever in Munich.....(cases in 1872)
12. " " normal temperature in Iowa.

The following notable points are to be remarked in studying these curves:

1. The parallelism of the curves of Michigan, Massachusetts, and New York City, with that of Iowa, but the curves all culminate in October and not in September.*

2. In regard to the European cities, these curves have a general parallelism among themselves, and also with those of this country, but there is no such uniformity in their culminating point as is observed here.

Among European cities, however, there is one marked exception, as will be seen in the line which marks this curve of typhoid fever in Munich, which culminates in February, and makes its lowest point in September. The curve of the soil-water in that city for 1872 is also given, and a comparison of the two curves seems to confirm Petenkoffer's theory that typhoid fever is inversely as the height of the soil-water. But the lowest soil-water occurs in April, and it is difficult to see any relation of cause and effect, with the greatest amount of fever which is in February, two months previous.

Liebermeister confesses his inability to account for the eccentricity of the Munich curve of typhoid fever. The curve of typhoid fever (Cases of 1872), is given also, and may be compared with the curve of the soil-water for the same year, when it will be seen the former culminates in July, just three months after the latter, which is in February.

* Typhoid Fever is now (October) prevailing greatly in New York City, and the unfinished curve of 1883 is also given.

With all due deference to the opinions of others who may differ with me, I would beg leave to suggest the following practical sanitary deductions, as fairly and logically deducible from the principles sought to be established in the foregoing remarks.

1. That typhoid fever in this country is not contagious, and not being placed in the same category with small-pox, scarlet fever, diphtheria, etc., does not need the minute directions for isolation, disinfection, destruction of clothing or fomites, etc., so eminently proper in the latter diseases. Such directions, in regard to a disease so common as typhoid fever, do more harm than good, and in this way: they are so minute and particular as to most people to seem impracticable, they are therefore neglected, and no ill consequences following, they are confirmed in their opinion (which in this case happens to be correct), that typhoid fever is not contagious, thus bringing contempt, more or less, for all sanitary regulations.

It may be remarked, can nothing be done to prevent typhoid fever? And it must be answered that in our present condition of knowledge as to the causes of that disease, but little can be done, and that in a general way. Our farmers would not, if they could, do away with the exuberant richness of the virgin soil, nor diminish the almost tropical temperature of our summers, yet these are the prime factors in the production of typhoid fever. Any one wishing to avoid this fever should look to the following points:

1. As to water, to see that it is as pure as possible. If from a cistern, that it is well-built and frequently cleaned. If from a well, that it is walled up with brick or stone, laid in cement, and is so situated that it gets no surface or soil-water contamination; that it has no wooden curb to rot and furnish a common cause of the fever (aqua-malaria).

2. The house should be well ventilated, not built, if possible, over a marshy spot, or one with a clay subsoil. It should have a cellar, either naturally dry or made so by efficient drainage, and this cellar should never be used as a store-room for vegetables, and if this is unavoidable, that these should never be allowed to rot.

3. No slop-water, nor indeed any kind of water, should be thrown upon the ground near the home. All garbage, if not

consumed by pigs, should be frequently removed, or better still, especially in towns and villages, burned up in the kitchen fire.

4. If drains exist, and they are exceedingly necessary to any well-ordered household, they should receive constant care and attention, that they have no leaks nor obstructions, and that they are as frequently and as thoroughly flooded as the water supply of the place will admit. Though fæces do not here play the important part in the production of typhoid fever as it appears to do in England, yet on general hygienic principles no accumulation of it should be allowed to take place, but where privies, and, still worse, cesspools exist, they should be kept from putrefaction by the abundant use of that good and cheap disinfectant, copperas.

5. In cases of sickness from typhoid fever in a family, isolation of the patient, so far as possible, is to be recommended, not from any fear of contagion, but to afford that quiet, and that abundant supply of fresh air so necessary in the treatment of all fevers. The stools should be disinfected and deodorized so soon as passed, not for fear of contagion, but upon the general principles of decency, and increased comfort to the patient, and all the household.

MUSEUMS OF HYGIENE.

The Parkes Museum of Hygiene was founded as a memorial to E. A. Parkes, M.W.F.R.S., Professor of Military Hygiene, Army Medical School at Netley, whose lamented death in 1876 gave incentive to his professional and personal friends to announce "that some steps should be taken to perpetuate the memory of a man whose existence had been of almost unparalleled utility to others; whose life had been from first to last unselfishly devoted to the benefit of his fellow creatures, whose scientific attainments were of the highest order, and the beauty and perfection of whose moral nature were such as to inspire affection and respect in all with whom he came in contact."

A public meeting was held at University College, London, on June 18th, 1876, Sir William Jenner presiding, when it was

unanimously resolved to establish a Museum of Hygiene, and in commemoration of the distinguished deceased to be called the Parkes Museum of Hygiene. The proposition met with considerable favor. Her Majesty the Queen donated £50, and succeeding subscriptions soon exceeded £1,000. The Executive Committee, with funds too limited to rent a suitable building for the Museum, received timely aid from the Council of University College, who, in February, 1877, placed at their disposal rooms rent free, and on June 28th, 1879, the Museum and Library was formally opened by Sir R. A. Cross, then Secretary of State for the Home Department. Owing to the ill-adaptability of the single room for museum purposes, the articles exhibited, which were contributed by the British Government, City of Brussels, the Government of the United States, various societies and individuals, were temporarily arranged under six classifications, viz: Engineering and Local Hygiene; Architecture; Furnishing; Clothing; Food; Preservation and Relief.

The Library contained a few hundred volumes, having reference to sanitary science, pamphlets and periodicals, a portrait of Dr. Parkes, photographs, a Ross's microscope and microscopic preparations of food substances. The utilization of the Museum occasioned a number of demonstrations and lectures, which were largely descriptive of its articles and apparatus, and were attended by numbers for the accommodation of which the Museum was barely adequate. In the winter of 1879–80 the first series of lectures was given for the benefit of the workingmen's Club and Institute Union, the subjects treated being House Drainage, Ventilation, Lighting and Warming, Food, and the Management of the Sick Room. A second series was given to members of the Institution of Builders, Foremen and Clerks of Works, on Ventilation and House Drainage. During the winter of 1880–81 a course of five lectures was delivered to members of the Metropolitan Building Societies, and comprised the subjects of Situation and Construction, Ventilation, Lighting and Warming, Water Supply and Filtration, Drainage, and Water Closets, Sinks and Baths. These lectures were given on Saturday afternoons, to which admission was had by free tickets supplied by the said societies and by the Curator of the Museum.

Deriving its support entirely from voluntary contribution s

the financial condition of the Museum was not satisfactory. The Executive Committee found that without any expenditure for rent, rates, or taxes, at least £200 a year would be required for the payment of a Curator, and to meet the necessary expenses. To create an endowment fund available for current expenses, the committee invested in the names of trustees £600 of the funds subscribed, and as but a small sum remained in the hands of the Treasurer, the committee were compelled "to confidently appeal to all those who are interested in Technical Education and Sanitary Science to help them in the work which they have on hand." The committee said further, "We are aware that the Museum is at present manifestly incomplete. This is necessarily the case. A Museum must be a thing of slow growth. The present collection is but a skeleton; a mere foreshadowing, we hope, of that which is to be, an earnest of our intentions in the future, and not by any means the consummation of them. The beginning—not the completion—of the Museum may be said to date from to-day."

In its imperfect and crippled condition, without adequate accommodation, and in a situation deprived of facility of access, the Parkes Museum partially supplied an existing want, and, as an earnest of what might be accomplished in the future, the Executive Committee were prompted to ask for that pecuniary assistance which alone would enable them to continue and extend the work of diffusing a knowledge of the laws of health among the classes upon whose education in such matters the health of communities largely depends.

Although under the patronage of the Queen and other members of the royal family, and in receipt of contributions from certain of the nobility, gentry, and the learned professions, yet the sums obtained were barely sufficient to continue its existence. To provide for a suitable building of its own in a central situation, and to have an efficient maintenance with means to perpetuate the lectures and demonstrations, and to make them of greater favor with the public, and of greater service to the industrial classes; to increase the collection and library, and to make it thoroughly available for research and teaching, it was estimated that a sum of £30,000 could establish the Parkes Museum as a permanent national institution, and as such to fulfill all requirements and satisfy the most sanguine expecta-

tions of its capabilities and invaluable results. In the furtherance of this proposition, and to bring it prominently before the public and the delegates to the International Medical Congress, the Executive Committee organized the International Medical and Sanitary Exhibition at South Kensington, from which a revenue would be derived from the sale of tickets of admission, official catalogues, advertising therein, from rent of floor and wall space, and from boxes placed at the entrances to receive the donations of visitors.

The Exhibition was a great success, and the proceeds derived therefrom materially assisted the Executive Committee in establishing the Museum upon a permanent basis in a building of its own. For the purpose of giving the Museum a legal status, the subscribers were incorporated on the 28th of June 1882, under a license from the Board of Trade. The new premises are centrally situated—74 A, Margaret St., Regent St., W., and consist of an Exhibition Hall, corridors, and offices, and a Library and Reading Room. In making the necessary alterations in the building especial attention was paid to the heating, lighting and drainage arrangements, so as to be available for teaching purposes. In the corridor a water service is provided, to enable various forms of sanitary apparatus to be exhibited in action.

The Council organized a course of lectures during the last summer season, the introductory being given by Professor F. de Chaumont, of Netley. Sir Henry Thompson, Mr. Earnest Hart, and others are the lecturers of the present winter season. The annual membership is £1 1s.; life membership £10 10s. The Museum is open daily, free to the public at certain hours, at other times a charge of sixpence is made, except to members. The library and reading room are open daily for the use of members and others recommended by members. The public opening of the new building occurred on May 26, 1883, under the Presidency of the Duke of Albany. The perpetuity of the institution is well assured.

The precedent given by the Parkes Museum was seconded by the establishment of an "Institut Complet d'Hygiene" at Montpelier, for which purpose the Government of France granted 25,000 francs, together with an annual appropriation for its support. As ample accommodations for its various labora-

tories, already supplied with many instruments, and Museums already furnished with many specimens were present in the University of France at Montpelier, the appropriations were liberal, and set forth the intention to make the organization a pronounced success from its inception, and to have a future utility commensurate with the desire and expectation of the projectors.

The Director of the Institut d'Hygiene, recognizing the difficulty of fully developing the same without the assistance of the public, notwithstanding governmental patronage, issued a circular soliciting that assistance. He appealed to producers and merchants for samples of such articles of merchandise as contribute to the support of life; to mechanics, manufacturers, engineers, architects, and inventors, for models or articles relating to public or private hygiene; to sanitary inspectors, for samples of adulterated food; to municipal officers, for plans of cities and public institutions, systems of sewerage, etc.; to societies, for plans and statistics of their asylums; to manufacturing companies, for the means employed of preventing danger to life; to public officials, private individuals and travelers, for articles and materials for preserving general health, and for useful information, or suggestions pertaining to the knowledge of disease and its prevention, and to the enhancement of conditions concerning man and his environment.

This in essential outline is the history of the Parkes Museum and the more recently organized Institut d'Hygiene, each being the result of long forming and well crystallized views of earnest and practical laborers in the field of sanitary improvement.

The examples afforded by the Parkes Museum and the Institut Complet d'Hygiene had a close following in Washington by the establishment of a Museum of Hygiene under the Bureau of Medicine and Surgery, Navy Department. In June, 1881, the Surgeon-General, P. S. Wales, took the initiative and instructed the delegate representing the Navy at the International Medical Congress in London, to visit the Parkes Museum and report thereupon. In the following year the Surgeon-General issued a circular announcing the organization of a Museum of Hygiene which was officially recognized by Congress in an act making appropriation for its support for the fiscal year ending June 30, 1883.

From its organization to the present time, the Museum has

occupied a former private residence which has been fitted up and arranged in the endeavor to make the most of the space available.

A quantity of suitable furniture for present and future demand in the exhibition rooms and library has been procured, and a water service provided, so as to enable various forms of sanitary apparatus to be tested, and a large number are exhibited in action.

The number of exhibits is two hundred and seventy, which will soon have a marked increase by contributions from California. Each exhibit has a specially printed descriptive placard-label, of color and style used at the National Museum.

The collection of articles, models, plans, etc., having reference to questions of hygiene, is arranged under the departments of Public Health and Comfort, of Life-saving and Preserving, and of Literature and Drawings. The departments are divided into the classes of Local, Personal and Public Hygiene, and these are subdivided. The exhibits are the architecture of private and public buildings, water-closets, urinals, traps and sinks with water attachment; culinary, laundry and bath facilities; systems of drainage and sewerage; modes of water supply, filtration, purification and distribution; apparatus for heating and ventilation; household requisites; approved and defective plumbing; materials and devices of construction; marine architecture, air ports, ventilators, model of hospital ships, galley, disinfecting machines; burial casket, grave vault, crematory; clothing, food, dietaries, military and naval rations; life-saving and protective apparatus, ambulances, cots, etc., etc.

The library of the Museum has over fifty-five hundred bound, and more than one thousand unbound volumes of foreign and domestic works of reference, etc., and constant additions, by purchase or gift, will be made. Pamphlets upon special subjects are bound together in volumes. Recent publications are ordered as soon as issued.

The reading-room has one hundred and fifteen periodical publications devoted to hygiene, science and medicine, many of which are the gift of Dr. Bell, editor of THE SANITARIAN. Complete files of these periodicals are being procured.

Three assistants are engaged in making an author and sub-

ject catalogue, which is well advanced. This catalogue, when issued, will be followed by supplemental catalogues.

Two assistants are employed in the laboratory and rooms for microscopy and photography.

The experience acquired during the past year demonstrates the necessity of establishing the institution upon a permanent basis in a building of its own.

There can be no question as to the ultimate, general, permanent effects of these Museums of Hygiene. When in the full life of sustained exertion, with definite motive, acknowledged authority and practical ability, they will steadily increase the avenues of scientific investigation and study of all matters relating to health, elevate the effect of invention, and in the wide diffusion of this knowledge, become salutary and corrective towards the physical and social well-being of the people.

WASHINGTON, D. C., Dec. 1, 1883. J. M. BROWNE.

SCHOOL HYGIENE.*

By CHARLES J. LUNDY, A.M., M.D., Professor of Diseases of the Eye, Ear and Throat, in the Michigan College of Medicine, Detroit.

In a short paper on school hygiene it would not be appropriate to discuss the system of education pursued in our public schools; and I trust that my remarks will in no way be construed as a criticism of that system. It may be necessary, however, to point out some of the ill effects incident to the pursuit of studies under that system. To do this, and to suggest remedies for these ill effects, in so far as I am able, will be the object of this paper.

I believe it will be admitted by a majority of careful observers that the course of study pursued in most public schools, and also in many academies and seminaries, embraces too many subjects. This necessitates too many hours of study and recitation at school, and also requires the pupil to spend much time in study at home. For the average pupil, the hours required for preparation and recitation are entirely too long. Eight, ten, and in some cases even twelve hours per day are de-

* Read before American Public Health Association, Detroit, Mich., Nov. 15, 1883.

voted to study and recitation. For example: Miss L., who is now under my care for an affection of the eye, recites six times a day, and each recitation occupies forty-five minutes. She is expected to study, and does study, five hours at home every day, in addition to which she studies music. She is a bright, intelligent young girl, and learns easily, but she complains that her work is too hard. Need I add that she is nervous? No, it is not necessary, for it would be remarkable if she were not. Some time since the question of overwork in the schools was discussed in New York, and during that discussion some startling facts were brought to light. It was shown that many pupils in the higher grades and in the grammar schools spent from ten to thirteen hours per day in study and recitation. This was the case even in the ordinary every-day work of the school, but at certain periods matters were much worse. In most, if not in all schools and academies there is pursued at times a system of study commonly known as the cramming system. During certain portions of each month, or each quarter, or each semester, as the case may be, the pupils are urged, if not actually forced, to make extensive reviews of subjects hurriedly gone over and imperfectly learned some weeks or months before. This cramming process is occasionally kept up for several weeks at a time, to the end that the pupils may pass well in their examinations. There is excited a sharp rivalry among the pupils, and this rivalry is often unwisely encouraged by the teachers, for the teacher is anxious to show the school superintendent or the school board how rapidly pupils advance under his or her care. This is a pernicious practice, and cannot be too strongly condemned. It subjects the pupil to unnatural mental strain, and the result is what might be expected. Why do so many pupils drop out of the classes and leave school at the end of one, two or three months after the beginning of the school year? It was shown in the New York schools that the average attendance was less than fifty per cent. of the number of pupils enrolled. It was estimated that three-fourths of the absenteeism was due to sickness. Of course much of that sickness was, in a measure, unavoidable, or at least was not due to school work. But that much of this sickness and absenteeism was due to cramming and overwork there can be no reasonable doubt. The experi-

ence of every physician will bear testimony to the correctness of this statement. Indeed, the timely interference of the physician in advising weak, delicate pupils to leave school often averts the impending danger of prostration from overwork. Need I say that nervous excitability, with ultimate prostration, headache, impaired digestion, lack of proper physical development, and myopia are among the many bad results of exciting competition and the long hours of study, especially when much of the pupil's time is spent in badly lighted and badly ventilated school rooms.

The importance of thorough ventilation of schools cannot be over-estimated. With a large number of pupils in a single room, the atmosphere soon becomes contaminated by exhalations from lungs and skin. In many schools the lack of proper ventilation is painfully manifest, especially in winter months. I venture the assertion, and without fear of successful refutation, that not one in three of all the school buildings in this great State of Michigan is properly lighted and properly ventilated. This, too, in a State that is a most liberal patron of education —a State noted among all States as having a superior educational system. And what is true of Michigan schools is true of the schools in other States.

It seems a little surprising that, with our health boards in almost every town, such a condition is permitted to exist. Were the masses of the people sufficiently educated to appreciate the importance of good ventilation in the school-room, they would not tolerate some things which now exist. I venture to assert that the next generation will not submit to the things which we now tolerate in this regard.

Just where to place the blame for the defects in ventilation of schools I am not prepared to state. I think, however, that it would be advisable to substitute for the law making attendance at school obligatory, one which would compel members of school boards and the architects who plan our school buildings to pass creditable examinations in sanitary science.

To compensate for the lack of proper ventilation, teachers sometimes resort to opening the windows of the school-room to admit fresh air. It will at once be seen that this remedy is as bad as the defect it is intended to correct. A draught of cold air is allowed to blow directly upon the pupils who sit in close prox-

imity to the window, the body is suddenly chilled, and a cold is the result. When the body is at rest the surface is easily chilled, and under such circumstances the pupil catches cold (in the ordinary acceptance of the term) from comparatively slight causes. Repetitions of these colds lead to chronic catarrhal affections of the nose, throat and ears. In this connection I may say that in many cases the temperature of the room becomes too high, owing to imperfect ventilation. In the majority of school-rooms the temperature ranges from 70 to 76, or even 78°, whereas it should not be more than 68 or 70°. In Europe a temperature for school-rooms of 68° is thought quite high, and a much lower temperature usually prevails. The warm atmosphere is injurious and unhealthful, and relaxes and debilitates the system. When pupils leave a warm, dry atmosphere with pores open and system relaxed, and go directly out into the damp, frosty air of a mid-winter day, they are very liable to suffer in consequence. This it may be impossible to entirely avoid, but if the temperature of a room is 68 or 70° and the atmosphere is pure the system is not so likely to be relaxed as it would be by an impure atmosphere of 76 or 78°, and every careful observer knows that when the system is relaxed is a time of great danger from sudden exposure to a cold atmosphere.

SEATS AND DESKS.—The construction and arrangement of seats and desks are worthy at least of a passing notice. Although the American schools are generally provided with better seats and desks than are the schools of most European countries, yet there is room for improvement even here. If seats and desks are faulty in their construction, or if they are not properly suited to the size of the pupil, they tend to produce deformity.

It is not necessary to discuss here the subject of deformities in general, or the ease with which deformity may be produced in the young and growing child. The facts are that a vast majority of deformities occur during the school age. Eulenburg, the noted orthopedic surgeon, states that 90 per cent. of all cases of spinal curvature, not due to special disease, occur during school life. In Switzerland, according to Liebrich, 20 per cent. of all school boys and 40 per cent. of all school girls have one shoulder higher than the other.

Dr. D. H. Agnew, the well known Philadelphia author and

surgeon, gives as the principal causes of spinal curvature, "unequal exercise of muscular power on both sides of the spine," and "occupations." The same author further states: "I am disposed to think that *partial* or *unequal use of the muscular system* is most commonly concerned in developing lateral curvature of the spine." It is not necessary to discuss here, even did time and space permit, how faulty and unnatural positions of the body may give rise to deformity, or the modus operandi by which the deformity is produced.

Although it is very probable that a comparatively small number of deformities occur in this country as a result of badly constructed and badly arranged seats and desks, yet we cannot afford to disregard this matter. Unless we would have our children less beautiful in form and figure than Nature intended them to be, we should not allow them to spend several hours, day after day, year in and year out, in seats and before desks not properly adapted to them. Different pupils of the same age will attain different degrees of advancement, and the higher the grade the larger the seat and the higher the desk. Then, again, pupils of the same grade will differ greatly as to height of body and length of limb. Thus it will be seen that the proper seating of the pupils in the school-room is no easy matter.

The seat should be so constructed as to support nearly the whole length of the thigh, as well as the pelvis. The seat should be of such a height as to permit the sole of the shoe to rest comfortably upon the floor. I have observed many instances in which the feet hung suspended between the seat and the floor because the seat was too high.

Every seat should have a back, either straight or but slightly curved, and sufficiently high to support the lower half of the spinal column. This latter will help to prevent undue strain upon those muscles whose function it is to keep the trunk erect, and at the same time it will not interfere with the respiratory function.

The proper adaptation of desks is even a more difficult matter than the arrangement of seats. If the desk is too high the pupil is obliged to elevate his shoulders unnaturally in order to rest the elbow and forearm upon the desk. Such positions are apt to produce the deformity found among 40 per cent. of the

girls in the schools of Switzerland. In other words, it is apt to make one shoulder higher than the other. If the desk is too low the pupil will lean over it or upon it. This stooping position is a bad one on several accounts. It makes the pupil round-shouldered, prevents the proper expansion of the chest in respiration, retards the flow of blood from the head, face and eyes, and favors the development of myopia. Liebrich says the desk should be high enough to enable the pupil to rest the forearm and elbow thereon without displacing the shoulder. He also advocates having the edge of the desk in a line perpendicular to the front of the seat. This general plan will be found to work quite well; and it insures a correct position for the body, and one in which there will be no unnatural elevation of the shoulders, and no necessity for bending the head over the desk.

For various reasons the top of the desk should have a slight incline or slope, instead of being flat. Everyone may observe how quickly the eyes tire in looking for any considerable time at objects placed much above a line horizontal to the eye. One may also observe that the eyes tire quite easily in looking at an object if it be placed too far below the horizontal. As we walk in the street our gaze naturally strikes the walk twenty or thirty feet in front of us. This is accounted for by the fact that the ocular muscles easily adjust normal eyes for binocular single vision at this point. Without taking time to explain the action of these ocular muscles, I will briefly say that, within certain limits, both eyes can be directed more easily to an object below the horizontal line than to an object above it. If, however, the object is too far below the horizontal line it strains the eye to look at it for any length of time. If a book be placed upon a flat surface either the head must be bent unnaturally forward to see distinctly or the eyes must be turned too far downward to be used with comfort. Besides, letters which can be seen distinctly at a long distance when the book rests at an angle of forty or forty-five degrees, cannot be seen at all at such distance when the book rests upon a flat surface. Of this fact any one may be convinced by making the experiment. This will in great part be accounted for by the fact that the letters are "foreshortened," and that their retinal images are smaller than they naturally should be.

On account of mechanical considerations the angle of 40 or 45° will be found too great when the desk is used for writing, and one of 20° will answer better. Therefore, every school desk should be provided with an adjustable top, so that it may be used either for reading or writing with comfort and convenience.

LIGHT.—Light in the public schools has received considerable attention within the past few years, and deservedly so, for it is an important subject.

Light may be deficient in quantity, poor in quality, or it may come from the wrong direction. That such defects in the lighting of our schools do actually exist may be demonstrated by examination in almost any part of the country. That a few —very few, indeed—of the more recently erected school buildings are well-lighted is a fact, but, unfortunately, the well-lighted buildings do not exceed one in five of the whole number. When light is deficient the retinal images are not clearly and well-defined. The pupil tries to obviate the difficulties in two ways. First, he increases the amount of light reflected from the book to the eye by bringing the book closer. It is not necessary here to speak of the well-known law that the reflection of light is in inverse ratio to the square of the distance of the object. Second, he tries to increase the size of the retinal images of the letters by bringing the book nearer than twelve inches. The nearer the object the more divergent will be the rays of light reflected from it to the eye. The more divergent the rays of light the greater will be the effort required to focus them upon the retina, and the greater will be the strain upon the internal recti and upon the ciliary muscles. But the pupil further adds to the danger by stooping over and bringing the eye nearer the book, instead of maintaining the erect position and bringing the book towards the eye. The result of this stooping, unnatural position, is congestion of the head, face and eyes by interference with the return of blood from these parts. The strain upon the eyes causes them to grow weary and ache if the work is continued. Indeed, we see many cases of inflammation of the eyes, and also of congestion of the optic nerve and retina, from this cause. Were this the appropriate place many examples could be cited.

We also see many cases of headache and great nervous dis-

turbance due to an unnatural strain upon the eyes, the prime cause of which was bad and insufficient light. But, while we see numerous examples of pain and discomfort of the eyes, and even of inflammation of the eyes, due to badly lighted school and living rooms, yet these are only the lesser evils. There is another affection much more important than these, in the production of which bad light, together with long hours of study, plays an important role. That affection is myopia, and to it I shall now call your attention, for in point of importance it is second to no subject connected with school hygiene.

Myopia, or near sight, indicates that condition of refraction in which parallel rays of light are not focused upon the retina, but in front of it when the eye is at rest. This is due to an elongated condition of the eyeball, and such eyes do not see distant objects distinctly, the far point being within definite distance.

The oculist regards such an eye as being something more than near-sighted, for he knows that more than four-fifths of the myopic eyes are diseased. With myopia he associates certain conditions upon which it depends. With myopia he also associates certain anatomical and pathological changes which have taken place within the eye. He is aware of the fact that progress in these pathological changes means an increase of the myopia. He is also aware that the disease may reach a dangerous degree, and that, in some instances, there occurs total loss of sight. Finally, he is aware of the fact that this disease can, in a great measure, be prevented, but that it cannot be cured.

The causes of myopia are both predisposing and exciting. It is a well known fact that children frequently inherit certain peculiarities of shape, form and feature. I have observed certain peculiarities of shape in the eyeball in three consecutive generations, and in all three generations these peculiarities led to the development of squint. Although children do inherit a predisposition to myopia, yet few, if any children are near-sighted at birth. In Germany, there are more myopic people than in any other country, and the children born of German parents in this country show a greater predisposition to myopia than do the children of American and Irish parents. The proportion of myopic pupils found by Drs. Loring and

Derby in the New York schools was, among German pupils 24 per cent.; among Irish pupils 14 per cent.; and among American pupils 19 per cent.

Chief among the exciting causes of myopia are close application to study in early youth while the tissues are lax and infirm ; long hours of study without proper periods of rest, and poor light, both in quantity and quality. Other causes are congestion of head, face and eyes, caused by the stooping position, or by tight clothing, or by cold feet ; badly printed books, and books in which the print is too small ; badly ventilated school and living rooms ; debilitating influences of whatever nature, and lack of proper physical exercise in the open air.

Very naturally the same causes will operate more seriously under certain circumstances than under others. The causes, which would produce very bad results among children residing in large cities, would not be likely to produce such serious results among children in small villages and country places. Indeed, I think many of the city schools are superior in their appointments to the schools of small towns and country districts, and yet the proportion of near-sighted pupils is always greater in the city than in the country. This has been shown in regard to German pupils, and undoubtedly similar conditions exist in this country.

Let us briefly examine the arguments bearing upon the development of myopia in the schools, and the influence of modern school life upon this disease. Some statistics upon this point may serve our purpose. These statistics have been prepared by able investigators both in this country and in Europe, and the results of the investigations show a remarkable similarity.

Dr. Cohn, of Breslau, Germany, found only 1.4 per cent. of myopic pupils in the village schools, while among pupils of the same age in the city schools, the per cent. of myopia was seven times as high. The per cent. of myopia increased year by year, until in the thirteenth and fourteenth years of school life, almost two-thirds of the pupils were myopic.

Dr. Conrad, of Koenigsburg, found that myopia increased from less than one-half of 1 per cent. at 7 years—the first school year—to more than 62 per cent. in the highest classes.

Dr. Erisman, of St. Petersburg, found myopia to increase

from 13 per cent. in the preparatory class, to 41 per cent. in the fifth class.

Pfluger found in the schools of Lucerne, a condition almost identical with that at Koenigsburg.

In the gymnasia at Vienna, Reuss found almost 60 per cent. of myopic students in the higher classes. Had not many students been compelled to discontinue their studies on account of the condition of their eyes, the per cent. of myopic students in the highest classes of the gymnasia would undoubtedly have been larger.

By these and other observers in Europe tens of thousands of pupils have been examined, and the results have been practically the same. In this country a large number of observations have also been made, and the results go to show a similar condition here. While the increase of myopia from year to year has not been so marked as in German schools, yet it is sufficiently great to arrest our attention. These observations show a steady increase in the number of myopic pupils through the primary and grammar schools, and through high school and college.

In the public schools of New York Drs. Loring and Derby found that 3½ per cent. of the youngest pupils were myopic, while among the oldest pupils—those of 20 to 21 years—the per cent. of myopes had reached 26.78. Examinations made in the New York College, under the direction of Dr. C. R. Agnew, showed that 53 per cent. of the junior students were myopic. Investigations made elsewhere, for example, by Prout and Mathewson, of Brooklyn; by Ayers and Williams, of Cincinnati; by Risley, of Philadelphia; by myself, in this city, and by others at various other points, show similar results. If the proportion of myopic pupils is a little greater at one point than at another, the difference is only trifling.

It has been further shown that myopia was most prevalent in pupils who spent the greatest number of hours in study. Erisman furnishes the following statistics: Of 4,358 pupils examined by him, all studied two hours out of school; some studied four hours, some studied six hours, and some studied more than six hours out of school. Of those who studied only two hours out of school, 17 per cent. were myopic; of those who studied four hours, 29 per cent., and of those who studied six hours and over, more than 40 per cent. were myopic.

Admitting that myopia is produced by attendance at school and by the conditions which such attendance imposes, is there anything to show that myopia does not prevail among children who are not subject to the conditions imposed by modern school life? There is. Dr. Macnamara, formerly Professor in the Calcutta Medical College, states that myopia is almost unknown among the lower classes of India. He informs us that in his examinations of the Aborigines of Bengal he failed to find a single case of myopia. The same author states that "whole races in India appear to be actual strangers to the disease." Among the colored race in this country myopia is as yet quite rare.

In England, where myopia is not nearly so prevalent as it is in Germany, the disease is found mainly among the better educated classes.

How, then, do long hours of study, poor light, bad ventilation and other influences bring about the elongation of the eyeball, upon which myopia depends? This is a pertinent question, and one I shall now attempt to answer. It is a well-established fact that vigorous use of any part of the human economy causes an increased flow of blood to that part. To this general rule the eye forms no exception. During close application to study the eyes receive a greater supply of blood than when the eye is at rest. If the application is long continued, and without proper periods of rest, the fluid contents of the eye become slightly increased, the coats of the eye become somewhat congested, and a slight increase in the tension of the eyeball is apt to occur. Now, it is not difficult to see that repeated, though slight, increase of tension may lead to stretching of the coats of the eyeball. Repeated distension of the stomach, as we often see in the case of gormandizers, leads to stretching of its walls and increase in its size. This is also true of other organs similarly formed. But there are other factors at work in the production of myopia. The muscles which turn the eyes in various directions, and especially the muscles which converge the visual axes, exert considerable pressure upon the eyeball from without. To this may also be added pressure from contraction of the ciliary muscle in efforts of accommodation. Now, as you will observe upon the model which I here show you, the recti muscles are

atached in front of the equator of the eye, and the ciliary muscle is also near the front of the ball. When these muscles contract upon the eyeball, it would be natural to suppose the globe would yield, if at all, at the point of least resistance. This is precisely what occurs. The tunics of the eye do yield at the point of least resistance, and we find in myopic eyes, especially when the myopia is of a high degree, a bulging of the eye backward at its posterior pole. This is shown in the diagram. But why do myopia and elongation of the eyeball occur so rarely among adults, many of whom use their eyes for near work for ten or even twelve hours a day? We have seen that nine out of ten of the bodily deformities occur in early life, when the tissues are lax and infirm, and when shape and form yield readily to bad influences. So it is with myopia; it occurs usually when the tissues have not yet hardened sufficiently to resist the evil influences of which I have spoken.

PHYSICAL CULTURE.—While it is not my intention to devote any considerable space to the subject of physical culture among school children, yet a few words upon so important a matter would not be out of place in this connection.

Dr. Brayton Ball says that "health may be described as that condition in which the various functional activities of the body are carried on with their normal energy and in a harmonious manner. For maintenance of such condition of the vital powers, a certain amount of physical exercise is indispensable, since the functions of respiration and of the circulation of the blood, which largely control the assimilative and disassimilative processes of the body, are directly and powerfully influenced by the activity or inactivity of the muscular system."

Any one who will carefully observe the physical appearances of our school children will be convinced that the "functional activities" of their bodies are neither carried on with harmony nor with energy. The listless air, the languid gait, the cold feet and hands and the lack of muscular development, especially among girls, at once indicate the lack of physical training. One very frequent result of this lack of physical strength is asthenopia, or weakness of the eye muscles. This condition is notoriously frequent among young people attending school and college. Nearly one-half the patients who come to consult me regarding this affection are school children, and

of these two-thirds are girls. If I ask one of these young girls how long she can walk without becoming fatigued the reply is, 20 or 30 or 40 minutes, as the case may be. Now, such pupils are expected to spend from six to ten hours in study and recitation, but half or three-quarters of an hour's physical exercise completely exhausts them. Instead of being exhausted by such trifling physical exertion, pupils should be able to perform light physical labor for as many hours as they usually spend in study. If we desire to have and to preserve the highest type of manhood and of womanhood in this country, we must cultivate our children physically as well as mentally. In the current number of *Harper's Magazine* there is an article entitled, "Our Children's Bodies," which I most heartily endorse. I would recommend every one to read it carefully. Especially would I recommend it to those engaged in the noble occupation of teaching.

Every one knows how a little "outing," as it is often called, or a few weeks spent in hunting, fishing or other out-door occupation helps to recuperate the exhausted energies of the over-taxed business or professional man or the accountant. Examples of this are so numerous that it seems idle to speak of it. Yet, we seldom think that physical exercise is necessary for our children who spend so many hours a day engaged in mental labor, at least, we provide no means for their taking this exercise in a proper manner. If it is necessary for the adult to take physical exercise in order that the vital functions may be well performed, how much greater the necessity for such exercise in the growing child. If we wish our children to attain the highest type of development, we must see to it that the physical is not entirely neglected for the sake of the purely mental culture. A child whose mental cultivation has been made at the expense of health and physical strength, is like a house built upon a quicksand. I have already expressed these sentiments so often that they may seem stale; but a good maxim, "Let the physical keep pace with the mental training," will bear repetition. How shall we provide for the physical cultivation of our school children? This is a question which will force itself upon the attention of our educators at no distant day. If I were to suggest a plan by which we could attain this object, it would be about as follows: In every city let the

school board appoint a teacher of physical culture. Let him be a man of sound mental training, not merely a man who has a large biceps or an expansive chest. Let him be thoroughly posted in the anatomy and physiology of the human body. Let him understand thoroughly the effect of physical training, and the advantages to be derived from such training when properly carried out. But, above all, let him be a man who thoroughly understands the danger of improper use of the muscles and of severe muscular strain, for hundreds are injured permanently by indiscretion in this regard. In a word, let him be a man who will teach the use of the muscles, not the abuse of them. We do not wish our children to become gymnasts nor acrobats, we simply wish to develop them physically as well as mentally, for by a harmonious blending of the mental and the physical we will obtain the highest type of manhood and of womanhood. Now, if a teacher of physical culture were to be employed as are teachers of penmanship, music and drawing, he could accomplish wonders. Under his general direction the several teachers could carry out the details of a general plan of physical training. A certain period of time each day, or better, a shorter space of time twice a day, might be devoted to physical training. This time could be very advantageously taken from the hours of recitation and one study could be discontinued. This plan would not entail any additional duty on the already overworked teachers. What the nature of the physical exercise or drill should be, it is not necessary to intimate here beyond that it should be light and simple, and such as would bring into play all the muscles of the body.

Although I fear my paper's length has already outrun your patience, yet I would beg your indulgence while I suggest a few remedies for the defects to which your attention has been called. In regard to overwork in the schools, I would suggest a reduction in the number of studies, some of which might well be dispensed with. Of some of the subjects taught, only the merest smattering is retained, and it were better to have fewer subjects and have those thoroughly understood. By discontinuing one subject, the forty minutes required for the recitation could be devoted to out-door exercise or to physical culture, which would be a great relief to the already overtaxed nervous system. The reduction in the number of studies

would also relieve the necessity for so much study at home. By thus lessening the mental labor, and by cultivating a taste for physical exercise, it would soon be an easy task to cultivate muscle as well as brain.

If we desire to have pure air in the school-room we must supply the means for removal of the foul air, as well as for the ingress of fresh air. Most authorities place the amount of fresh air required to keep the atmosphere of the school-room at a healthy standard, at 2,000 to 2,500 cubic feet per hour for each pupil. This air should be warmed before distribution to the different parts of the room. To remove a like quantity of foul air would require a ventilating capacity much greater than I have anywhere observed. To correct the existing defects, I would suggest the procuring of facilities for heating and distributing a much larger quantity of fresh air than is now admitted, and the introduction of well-heated ventilating flues where none now exist, and also an increase in the size or number of such flues in the rooms already partially supplied in this respect.

If we wish to avoid the ill effects of poor light, which we found was an important factor in producing myopia, we should see to it that our schools are better lighted. Light should not come from the back, for a shadow will be cast upon the book or paper by the pupil's head and body. Light should not come from the front, for it irritates the eyes. In nearly all schools black-boards are placed between windows, thus compelling pupils to face the light for a portion of the time. In very wide rooms it is impossible to light all parts of the room properly if the windows are on one side. Light should be abundant; it should be distributed to all parts of the room, and it should come from a proper direction.

The proportion of window space should equal 30 to 50 per cent. of the floor space. In many schools the window space does not exceed five per cent. of the floor surface. Sunlight should not be allowed to fall directly on the paper, for it will irritate the eye.

The school-room should be oblong and not wider than a space equal to twice the height of the window. Such a room can be properly lighted from one side, which should be the left. For wider rooms the windows must be placed on both sides.

In conclusion, let me suggest the following rules, observance of which will materially help to remedy existing defects:

1. Avoid the cramming process in education, and the nervous excitement due to the spirit of rivalry.

2. Reduce the number of subjects in the curriculum, and shorten the periods of study.

3. Ventilate the school-rooms in accordance with the most approved methods.

4. Regulate the temperature of the school-room—an atmosphere which is too warm debilitates the system.

5. Provide properly constructed and arranged seats and desks.

6. Instruct pupils to sit erect, and to hold the book or paper at least 12 inches from the eye.

7. Provide highly myopic pupils with proper spectacles, which will enable them to read at the natural distance of 12 inches.

8. Furnish pupils with well printed books.

9. Furnish abundance of light, without producing glare. Let it come from the left side if the room is narrow, from both sides if the room is wide.

10. Provide for the physical education of school children, and teach them the importance of out-door exercise.

PHYSICAL TRAINING.*

By Professor J. MADISON WATSON.

Physical training is the essential, in the evolution of animal life from the lower type and state to the highest excellence. Let it be sharply discriminated from physical exercise. The latter, necessary to mere existence, is primarily secured by an irresistible impulse of nature, common alike to man and the lower animals. The kitten, the puppy, the young hare, the colt, the calf, the lamb, the kid, the fawn and the child skip, dance, race, romp, frolic, and enjoy to the utmost their muscular sense in hearty sympathy.

In their primitive state, Jehovah pronounced all living crea-

* Read before the American Public Health Association, Detroit, Mich., Nov. 14, 1883.

tures *very good*, not perfect. Even man, made in the image of God, and having dominion over every living thing of earth, "infirm of purpose," was saved only by work, discipline, training. Man, the provident and wise trainer, co-worker with the Deity, has a mission high, holy, limitless.

This great country of ours in its plastic state—with oceans, inland seas, chains of mountains, mighty rivers, primeval forests, every variety of surface, soil, climate, product, rich in all the elements that prodigal nature could bestow, having a conglomerate population of all varieties of races and conditions, unparalleled in the rapidity of its increase, and giving promise of a material prosperity in the near future, heretofore impossible—presents a problem too vast and complex for present comprehension, a problem whose successful solution involves the highest interests of humanity.

Though familiar, how bewildering the facts of this statement! How impotent the mind of man to forecast the physical and social changes involved in the early reclamation of continental wastes, with the inevitable climatal diseases, and the indiscriminate union of all human races and family strains! And here, Mr. President, it is not too much to claim that this Association represents one of the most important factors of the great problem, and that physical training is the substructure of these vital interests.

In this presence it would be as much a work of supererogation to urge the importance of physical culture, as that of pure air or living water. And still, in practice, even men of eminence in the learned professions, who encourage every wise effort for special mental training, are too commonly content with vague and general bodily exercise, which makes nothing for aptitude, special efficiency, or symmetrical development. The whole history of physical training is a most extraordinary exhibition of man's fickleness and pitiable vascillations. At one period made fierce, savage and aggressive by exclusive and overdone bodily discipline—illiterate, immersed in narrow specialties, and despising all beyond; at another, deifying the mind at the expense of the body and lapsing into decadence.

In ancient Attica and Ionia these two antagonist errors were first co-ordinated. The powers of the mind and the body were developed in common, and the resultants were incom-

parable beauty of bodily form and feature; a language unrivaled in sweetness, expressiveness and perfection; the highest philosophy; the truest and most inimitable art. In this century, the adoption of a like educational policy by Prussia, during the life of Bismarck has accomplished results quite as wonderful as the most marvelous of antiquity.

In the last two decades we have made a decided advance in the science of physiology and hygiene. The elemental laws of health, so generally disseminated, are not without promise of fruitage. Physicians of every school readily employ a modified materia medica, trusting less to drugs and more to air, water, electricity, dress, exercise, and other natural agents. The formation of numerous sanitary associations, the establishment of national, State, and local boards of health, and the popularization of physical activities mark the spirit of the age and solicit the suggestions of specialists. First let us consider

THE FITTING PERIOD FOR PHYSICAL TRAINING.—In Grote's profound and elaborate history of Greece we are informed that, "From the early age of seven years, throughout his whole life as youth and man, no less than as boy, the Spartan citizen lived habitually in public, always either himself under drill, gymnastic and military, or a critic and spectator of others;" that, "Besides the various descriptions of gymnastic contests, the youths were instructed in the choric dances employed in festivals of the gods, which contributed to impart to them methodized and harmonious movements;" that, as the grand purpose of the Lycurgean system was the maintenance of a vigorous breed of citizens, "The Spartan damsels underwent a bodily training analogous to that of the Spartan youth—being formally exercised, and contending with each other in running, wrestling and boxing—the presence of the Spartan youths, and even of the kings and the body of citizens, at these exercises, lending animation to the scene;" and that "In like manner, the young women marched in the religious processions, sang and danced at particular festivals, and witnessed as spectators the exercises and contentions of the youths." We may well conceive that such an education imparted an eager interest in physical might and beauty that would incite fond and enthusiastic mothers to begin the bodily training of their children at birth.

New York, the past summer, afforded a most felicitous illustration of the happy results of four score years devoted to physical activities. An eminent engineer celebrated his eightieth birthday by doing his usual amount of work with his accustomed energy. He arose at seven o'clock, indulged in his customary gymnastic exercises, ate a breakfast of eggs, bread and ice-water, and then worked till late in the afternoon, when a dinner was served. Then came further protracted work, followed by a long walk, which closed a daily programme, strictly observed during many years. Old friends knew that he would not receive their congratulations, and did not trouble him, during the hours set apart for experiments. Indeed, it is not absolutely certain that he was aware that it was his eightieth birthday, until numerous congratulatory telegrams arrived. One from the Society of Workingmen of Sweden stated that, in Sweden, he was regarded as the foremost worker of the world. A native of Sweden, at 13 years of age he joined a corps of engineers who were surveying a ship canal, and was placed in charge of a section. He visited England in 1826, and immediately began important experiments with steam engines. Thirteen years later he came to this country to try his fortunes at ship-building. His surprising little monitor capped the climax of his earlier successes. He is of medium height, and robust figure. His features are pleasant; his hair only slightly tinged with gray; his health perfect; his strength not abated. Upon the site of the small hut in which he first saw the light, stands a granite shaft 18 feet in height, with the inscription, "John Ericsson was born here in 1803." In this case it is no travesty to change "God save the king" to "God save the foremost worker of the world."

Asserting, what may be easily maintained, that continual physical training should begin at life's very dawn, as it alone can make sure even the best physical gifts, let us consider in the second place—

THE KINDS OF EXERCISE ADAPTED TO THE ENTIRE PERIOD.—It may be well, however, first to illustrate briefly, from history, the ideal aim of human training. This ideal, to-day, is virtually that of Epaminondas, twenty-four centuries since. He mastered the gymnastic and military exercises incumbent on every Theban citizen. But he studied to acquire the max-

imum of activity rather than of strength; the nimble movements of a runner and a wrestler, not the heavy muscularity of the pugilist. He also learned music, vocal and instrumental, and dancing—in those days including all that belonged to the graceful, expressive and emphatic management, either of the voice or the body. He also manifested, from his earliest years, an ardent intellectual impulse, and finally achieved intellectual triumphs—his eloquence being effective, even against the best Athenian orators. His greatest virtue was his mastery over resentful and vindictive passions. The results of this training are given by his greatest enemy, in the exclamation—"Oh, thou man of great deeds!"

A convenient classification involves exercises for family training, for the school, and for subsequent years. The corrective, remedial, or medico-movement exercises of early infancy, applied under the direction of a trusty family physician, or by a trained nurse, are of incalculable advantage. Nothing, then, can more effectively allay suffering and give cheer. Indeed, during this plastic period, local weakness, imperfect development, and even hereditary defects, may be thus entirely remedied, or greatly mitigated. From two to seven years of age—the period of childish wonder, of eager curiosity, of importunate inquiry, of endless imitation, and of implicit faith—is the children's germ-time of health, the parents' golden opportunity. My brief admonition to them is, "Keep the home cleanly, and bright and sweet with sunshine and pure air. Garnish it with flowers, grasses, leafage, or other simple objects, easily obtainable by all. Enjoy daily music, if only that of the children's voices. Set apart a suitable place in the house, the barn, an out-building, or out-of-doors under a spreading tree, for childish games and physical training, both with and without apparatus. Become the interested observer and wise instructor, when at leisure or during after-hours. Adopt a simple, wholesome diet—the first-fruits of the earth for food and water for drink. Wear pure clothing, live a pure life, get nearer to the great heart of nature, and so "your children shall rise up and call you blessed."

The physical activities of the schooling period, from kindergarten to the graduation at a college or a university, include all desirable games and exercises, done with and without every

conceivable apparatus, implement, machine, appliance and tool. And still, for a given grade and period, the best results of training are secured with a few select instruments and exercises. The primary office of school calisthenics is to beautify and strengthen the body by pleasurable exercises, which shall develop, regulate and perfect its parts. It is mainly recreative, giving relief to the mind while gratifying the physical sense. Hence, some of the essential elements of success are, first, such a natural, systematic and logical arrangement, that each position and class of movements shall suggest what is to follow, without taxing the memory or other mental faculties.

Second. A simple, systematic, and complete series of commands is necessary, the students taking the positions and executing the classes of movements in accordance therewith. This will render the instruction intelligible, give the instructor the entire control of the class, and enable him, after the elementary movements are mastered, to command and immediately secure thousands of beautiful combinations without further instruction.

Third. The movements must have a determined time, the rhythm or division of which shall be well established in the mind. All modes of marking time should be used, such as counting, phonetics, recitation and music. The latter insures enthusiasm and fascination, and converts indolence and sluggishness into cheerful and vigorous activity.

Fourth. The desired results of the training can only be secured by healthful conditions. These involve comfortable, cleanly, convenient and suitable dress—garments so loose about the waist, chest, and neck as not to interfere in the least with the action of the respiratory organs; pure out-doors air in summer, and air moderately heated in winter, say from 65 to 70 degrees. But during the continuance of the exercises, the windows should be opened, so that the room may be thoroughly ventilated. At the close, when a sensible perspiration has been produced, the windows must be so closed or regulated as to avoid all draughts of air, and still afford, as far as possible, a perfect ventilation.

Fifth. A definite time should be adopted for daily exercises. At least one exercise should be given in connection with each session. In large schools, the general recesses of the

regular sessions should be discontinued, and individual recesses given as needed. Half the time of the general recess is usually lost in descending and ascending flights of stairs, involving anxiety and insubordination, and destroying the continuity of the lessons. Instead of the recess in the middle of the session, there should be two short class-room recesses devoted to calisthenics, marching, or vocal music, and to thorough ventilation. Indeed, these exercises are the safeguard whenever, from the condition of the air or any other cause, classes become restless, listless, or inattentive. This is especially true in the country, where rural occupations in the open air unfit youth for indoor confinement, and fixed and continued attention. There the best results can only be secured in connection with frequent physical exercise.

These elements of success require an extensive and varied system of light gymnastics, both with and without apparatus, well adapted to all places, ages, and conditions in life; to individuals and classes, and to both sexes, thus successfully providing for the social element. That we may intelligently and fully appreciate the requisites of such a system, let us remember that the lungs, voice, organs of speech, features, joints, sinews, and all the voluntary muscles are susceptible of, and should receive, special physical training. While the exercises without apparatus have their special advantages, and satisfy nearly all these conditions, in order to secure greater variety and precision, more rapid development, and prolonged interest, apparatus of the right kind is almost indispensable. Wooden wands, dumb-bells, hand-rings, and Indian-clubs are the leading movable implements for school and family use. Slight, simple, and always available, they afford an almost unlimited number of the most varied, graceful and powerful exercises, bringing into play every muscle, joint and member of the human body.

GYMNASIA AND INSTRUCTORS.—Though something more than rudimental and altogether admirable, these exercises do not occupy the larger place—the field of greatest interest, of unlimited promise and possibility. This field can only be occupied by the gymnasium of to-day, which combines all the excellences of ancient and mediæval gymnastics with the thousand varieties of modern apparatus and the myriad exercises

connected therewith. The gymnasium, in charge of a competent instructor, is to-day an essential of every thoroughly equipped institution of learning, beyond the primary school, of whatever name or nature. This is especially true of the public grammar school, high school, college, and university; of reformatory, trade, agricultural, and military schools; and of theological seminaries, medical colleges, and teachers' normal schools. Let the gymnasium here, as in Russia, win the first place in our system of education, so that popular schools of the higher grades shall be known as gymnasia. Let every considerable town have its gymnasium, or central grammar school with a gymnastic department, as well as every large grammar or high school of the city. An additional story, with a sloping roof and supplying all the requirements of a good gymnasium, can not materially increase the cost of a new building.

The most effective means for the accomplishment of these results are, that all national and State aid to public schools, and all college or other educational endowments be conditional, requiring effective physical training; that physical culture be made a part of the regular curriculum, and a practical knowledge of gymnastics a requisite for graduation; and that students have not only the opportunity and means to counteract and overcome cases of abnormal development or weakness, and to secure and maintain the uniform development of all the muscles of the body, but that they have wise supervision and instruction. Let it be known that in the employment of teachers those having a practical knowledge of school gymnastics will be preferred. The salary should be liberal and the position permanent. The superintendent and instructor of a college or university gymnasium should be not only a superior gymnast, but a teacher of liberal culture, an educated physician, a member of the faculty, and supreme in his own department. With competent provision and intelligent supervision will come bodily inspection, the gradation and classification of students with reference to individual conditions and needs, and the adoption of progressive courses of elementary exercise, ever widening and ascending, until the transfer is made to regular gymnastics with fixed apparatus, and a permanent interest secured.

VOCAL GYMNASTICS, though transcendently interesting and

important, is so generally neglected, so indifferently taught, even in our best institutions of learning, that it justly claims the special consideration of this representative body. It involves the development and training of the respiratory organs, of the organs of speech, and of the voice. The respiratory organs should receive such special daily exercise as shall tend to enlarge, invigorate and bring under the control of the will the entire breathing apparatus, so that, even under the most trying and extraordinary circumstances, a perfect respiration may be secured. The vocal muscles receive nerves from the brain and are also under the guidance of the will. The muscles of the organs of speech are the chief agents of expression in man. When disciplined to act smoothly and with perfect freedom, they add greatly to the beauty of the human countenance. A well-trained and musical voice, with its graceful and easy articulation and its infinitely varied and precise movements, in conversation, oratory, and song, possesses marvelous powers of fascination. It makes the very difficulties of articulation tributary, serving as elements of force and beauty in delivery. Vocal gymnastics, properly employed, commands and wards the citadel of health, and wins social and political distinction. The present season supplies a most striking illustration of the inharmonious and unfortunate results of neglect in this direction. A metropolitan hall is crowded to its walls by a brilliant audience, assembled to hear the first lecture of a distinguished foreign poet and essayist, and to hohor the worthy son of a noble father. He is escorted to the platform by gentlemen of high social and literary standing. Faultlessly attired and of winning presence, he is welcomed by a gentle burst of hand-clapping, to which he responds by bows and smiles. At the close of a stirring introductory speech by the chairman, he steps forward and is again applauded. When all are silent with expectation, he begins his discourse. Confined to his printed lecture and gesturing only with his head, he speaks in a low, harsh tone, with mouth nearly closed and pursed-up lips, smothering most of his consonant sounds, and dropping his voice at the close of each sentence so that the last two or three words are inaudible at a rod's distance. Anxiety to understand the speaker, finally overcomes forbearance, and he is interrupted by cries of "Louder!" and "We can not understand you." The

audience listen with rapt attention to catch every word possible of the admirable lecture, and applaud long and loudly at its close. How fitting the illustration, how needless all comment!

Gymnastics is never to be used as a substitute for plays. Indeed, properly employed, nothing else gives so good an appetite for innocent out-door life, or so great a desire for natural spontaneous exercise. During the most interesting period of childhood, let no attempt be made to suppress the animal energy and untamed enjoyment of the vigorous child, be it boy or girl. In advancing youth and throughout the schooling period, physical sports and games, such as running, jumping, hare and hounds, base-ball, foot-ball, cricket, lawn tennis, lacrosse, and boating, under proper guidance and restrictions, are admirable, and they should receive encouragement and support. They are, however, mainly recreative, for general invigoration, used most by those who need them least, too often not made a happy means to a noble end. Physical training attains its aim when it prepares the young to take an intelligent, serious, and lasting interest in their own physical culture and development, an end vastly higher than interest in school or college sports.

In the early days of existence, when man had to establish his dominion over the beasts of the field and the brutes of the forest, when the inferior tribes, hardly emancipated from the lower forms of life, crept out of caves and huts to see the nobler races go forth to exercise those rude arts of war, hunting and reveling, which alone marked their standard of civilization, there was a nobility, sprung from necessity, which richly deserved the name. But now to live for nothing but hunting, fishing, boating, and athletic sports—now, when these arts have degenerated into childish imitations, *to live* for them is simply ignoble. The cultivation of human muscle, of brawn without brain, of professional athletes, for gamblings and public struggles for money or fame, is degrading—a crime against humanity.

Physical exercises subsequent to the schooling period, however symmetrical the education, should be employed with the same regularity, if not to the same degree, as mental activities. Let the fact be fully recognized and acted upon, that

training alone insures retaining, that length of life and prolonged happiness depend on the continued cultivation of mental and physical existence beyond all else. Ceasing to learn is beginning to die. Schooling is not only needed for girls and boys, but for men and women through every phase of life, if they would complete their career. The early interest and enthusiasm awakened in gymnastics, and the skill acquired by systematic training, may easily be perpetuated. In this respect the maxim, "The child is father of the man," is no less true than the proverb, "Train up a child in the way he should go, and when he is old he will not depart from it."

In conclusion, permit me briefly to refer to two results, "devoutly to be wished," which must inevitably follow the perfect consummation of physical training. First, the practical knowledge of the mechanism of God's crowning work, the human body, of the wonder-working hand, the source of man's supremacy, is such a personal revelation of aptitude as must tend to a diversity of callings, thus supplying from the yearly graduates of educational institutions, who now crowd the professions, the intelligent, trained and cultured recruits so greatly needed in all human occupations. Second, this knowledge should awaken such a genuine admiration and reverence for the human body as shall tend to shield it from intemperance, fashionable folly, sad sins of omission and commission, gross immorality, and criminal violence. It also should aid us to discern in this body God's living temple, whose open portals must be guarded day and night from every approach of evil—a temple to be cleansed, garnished, beautified, and made meet for the indwelling of the Holy Spirit.

THE DISPOSAL OF HOUSE REFUSE.*

By J. P. Spencer, C.E., Newcastle.

The question of the disposal of house refuse having frequently come before the sanitary authorities of this country, and apparently without any unanimous conclusion having yet

* Paper read at the meeting of the North Eastern Sanitary Inspection Association, Carlisle; with additions.

been arrived at, it may not be out of place briefly to review a subject which is not only important in itself, but appears always to bring out a free expression of opinion and a considerable variation of sentiment, whenever it is introduced.

Too often these discussions have been allowed to lapse into the controversy as to whether the water-carriage system of the disposal of sewage, the pail system, or some modified form of either of these was the best; but it must not be forgotten that in cases where the sewage has been disposed of in the best form of water-carriage operations, the ashes and other refuse remain still to be dealt with.

In this paper it is proposed to touch on the question of sewage disposal to a very small degree, and only as bearing upon these classes of dwellings where the present water-carriage system is found by experience to be scarcely suitable. The condemnation by sanitary reformers of the old style of ashpits or middens is now universal; but it is not so many years since it was thought the best and most approved method of disposing of refuse. Unfortunately, while the workers and thinkers in sanitary science are active and anxious for the public health, the Legislature is, as usual, a long way behind. All sanitary engineers, medical officers, inspectors of nuisances, medical men generally, and all thinking and intelligent members of the community condemn the system known as the privy and ashpit; yet the statute book requires that such shall be provided, and there it stands.

The first step in the right direction appeared to be an effort commenced about fifteen years ago, to so construct these ashpits as to cause the ashes to fall upon the most offensive contents, and to some extent absorb the gases. This, however, was not found to be practically effective, and moreover it assumed the principle that the accumulation of refuse for many days, and even weeks, was inevitable This must be wrong, and any mode which favors the accumulation for more than two days should be discountenanced. Nightly removal would be better, and is by no means impracticable either on the score of expense, or for any other reason.

The first suggestion of the pail system appeared to come from Rochdale, where it was at once commenced on a large scale, and has since been greatly improved and developed.

Here, however, the collection of refuse is in large tubs, separate from the privy pails; and this again would seem to involve a somewhat prolonged accumulation. If so, it is a mistake, as next in importance to the immediate removal of sewage comes the daily removal of refuse.

It may by this time be inferred that the object of the author is to recommend the nightly removal of house refuse and the avoidance, at any reasonable cost, of a prolonged, or large accumulation on the premises.

Up to the present time there seems to be no better mode of accomplishing this than the pail system. This plan, to be successful, should be carried out in conjunction with efficient drainage; because if no proper gullies and drains be provided the temptation will arise, among the poorer classes, to throw slops into the pails. This would greatly detract from their usefulness, and probably cause them to become a nuisance. Hence it is certain that the present pail system is by no means perfect, but it must be acknowledged to be a great improvement.

The question whether or not the excreta should be allowed to go into the pail is open to doubt; if it be so, by far the best mode is to have only the pail, and to allow the excreta, the ashes, and other refuse to be all put into it.

This is the least offensive, the least costly, and probably the least unhealthy process. A large proportion of the gases are absorbed by the ashes and dry rubbish, and the latter also constitute a convenient vehicle in the form of which to convey the refuse away. As a rule this also prevents the pails from becoming very dirty, and a free sprinkling of deodorizing powder is generally all that is required.

Where water-closets can be provided the nuisance liable to arise from the refuse pails should be really a minimum. Unfortunately, for the lowest class of dwellings, no suitable water-closet has yet been invented, and, failing this, the next best thing appears to be the pail system.

A great objection is sometimes taken to the alleged nuisance caused by the vans conveying the pails through the streets: this applies chiefly to what is known as the separate pail system.

The ordinary ashpits are now generally cleaned out at night

time, and no great nuisance, in a properly managed town, ever arises from the conveyance of the contents through the streets at night. The only nuisance is where the refuse heap has temporarily lain on the street, or where, from neglect, the ashpit has been allowed to remain too long a time without being cleaned out. This on the pail system would be abolished, and there is no valid reason, in most towns, where back lanes exist, why the contents of the pails should not be emptied into ordinary carts every night and conveyed to the depot.

Having got the refuse to the depot the next question is, what to do with it. In country towns the distance is not too great to have the depot in some suburb where it cannot be a nuisance, and there it may be allowed to remain until gradually taken for light manure by farmers.

In large towns the distance is too great, and if no sale can be obtained for it, in its crude state, it should be burnt. There is now no difficulty in disposing of it in this way, as suitable destructors have been established in many towns with excellent results.

The question of cost is no doubt an important one, but the question of health is more important.

The expense evidently varies to a large extent in different districts; for instance, the cost of the pail system in Bury was something like 16*s*. per pail per annum. This included cartage and every legitimate charge. It was not stated whether any special circumstances rendered the cost greater in Bury than elsewhere; but the author's experience is that in some other places the cost is not so great. In the borough of Tynemouth, for instance, the cost is only 7*s*.; in Birmingham it appears to be about 15*s*.; but in judging of the relative costs, it should be borne in mind that if water-closets were at once substituted for every pail closet in the district, the refuse would still cost a great deal for disposal in the aggregate.

In speaking of the cost as above it is only right to say that in Birmingham the pails are removed in vans and cleaned, whereas at Tynemouth they are not, and should that be done at the latter place an additional annual amount of about 4*s*. per pail would have to be added. Of course the expense must depend to some extent upon the distance from the depot and other local circumstances in each town, but the author esti-

mates that an average cost of 12*s*. per pail per annum is sufficient to include daily removal and cleansing of pails, so as to prevent any nuisance.

The cost of cleansing the pails is no doubt very great; but where the excreta and the ashes are all put into the same pail, and reasonable care is taken to provide drainage and keep out slops, it will be found unnecessary to remove the pails to the depots for cleansing, except at intervals in the poorest neighborhoods. Where cleansing becomes after a time necessary, the author suggests that in the case of galvanized iron pails it would be better to use heat instead of water for the purpose.

A proper drying process, which could be easily devised if a destructor furnace were on the premises, would speedily destroy any injurious attachment or incrustation. In the case of wood pails a simple sluicing with a hose would be a less effectual but still perhaps a sufficient mode of cleansing. Like everything else, the pail system requires a little tact and management in the working; and this is, it may be presumed, one of the duties for which inspectors are engaged.

The first cost of construction of the pail receptacles is very small, for where the cost of a water-closet with ashpit attached would be over 20*l*., or the cost of a privy and covered ashpit 17*l*., the cost of a pail-closet would not exceed 10*l*. built of brick and roofed in, and including 4*s*. for the pail. This should fall upon the owner, and he should be required from time to time to renew the pail when worn out. A pail will last, however, for many years.

Like every other reform, the pail system of disposing of house refuse has, and no doubt will still have, many difficulties surrounding it. The mere fact of the gradual favor that the "combined" pail system is gaining over the separate system, on the question of sentiment or nuisance, is a proof that it is gaining headway. The only, though vital and important, argument in favor of the water-carriage system of sewage—viz., its immediate removal from the premises, is the same which forms an important element in the pail system of refuse removal; consequently those should carefully and impartially consider the one, who consistently advocate the other.

Above all things it is to be hoped that no difficulties or expense, either temporary or permanent, will ever induce any

sanitary authority to return to the unsanitary and dangerous system of fixed ashpits. No argument, and certainly no reason, can be found to justify such a course; and, whether they be constructed as privies or as ahspits only, and on some modified or even improved form, so long as the principle of them involves the accumulation and long detention of the refuse, they must be wrong. No precaution can really be taken to render them innocuous; and even if they be lined out with cement, which will crack; or sloped inside, which will leave a sharp furrow at the bottom for liquid refuse; or sunk into the ground, which will cause percolation; or kept above the ground, which will cause leakage upon the surface; they will surely remain offensive, less only in degree than the old unhealthy privy and ashpit which has in times past slain so many thousands.

The author, therefore, ventures to recommend all concerned to avoid any kind of fixed accumulative ashpit, whether ancient, modern, or modified in type, and to insist upon such a practice as will absolutely entail a removal every second day, and enable a convenient system of removal every day, whenever considered expedient, in consequence of infectious disease or other causes. In all cases of infectious disease the pail system is most important and by far the safest.

In the water-carriage system of sewage disposal, the germs of disease are carried away through miles of pipes, having thousands of connections or inlets into houses spread over a large area. They are carried off out of sight, we know not whither, and left to be stranded, we know not where—probably to propagate infection and breed disease in diverse quarters. This danger need not occur in the pail system, because the germs of disease can be secured and destroyed at once without further chance of propagation.

The following, among others, is a good way of dealing with the danger. Immediately a case of infectious disease is reported at the Health Department, let the ordinary pail be removed from the house where the patient lies, and a pail of a distinctive color—say bright scarlet—be put in its place. Every night it could be removed, and, it being a standing rule that every scarlet colored pail be destroyed after being once used, the contents *and pail* would be burnt at the depot, a new special pail being substituted each time of removal, and, in turn, burnt.

Thus, at a small extra cost of a few shillings per day, the probability of the spread of infection from this source would be obviated.

This method has been carried on for some time past at Nottingham, and has been found to be very beneficial as a precaution, and great credit is due to the Sanitary and Health Department there for having introduced and carried out such a good practical mode of checking the spread of infectious disease.

The important question of refuse disposal as well as of sewage disposal, is yet far from being fully developed, and is still in a transitional state; hence none of us can afford to be dogmatical, and these remarks are put forward expressly for the purpose of raising discussion and eliciting useful information, and not by any means with the idea of propounding a settled practice. The author, however, ventures to advance them in arrest of hasty judgment and premature condemnation of the pail system of refuse disposal; and, while he leaves, on the present occasion, the advocates of the separate system of pail closets to defend their practice, he has no hesitation in recommending the pail system for the reception and removal of house refuse, whether it be used as an ashbin only, or as a combined privy, ashes, and refuse receptacle; and if such a mode of refuse removal cannot be approved by all, it is hoped that at least until some better method is propounded, its present merits will be recognized.—*From the Sanitary Record.*

SOME CAUSES OF INFANT MORTALITY.

> "Ill fares the land, to hastening ills a prey,
> Where wealth accumulates and men decay."—GOLDSMITH.

To say that children are destroyed by the million every year would, by many, be considered a very harsh expression; to say that they are neglected and allowed to die from want of care, would be less than the truth. Still, nobody will deny that the mortality among children is terrible. This is a question of no ordinary interest. It is important to the family; important to

the State. Socially and politically it must force its way to public attention. From year to year THE SANITARIAN has directed the attention of its readers to this subject. Every volume contains valuable instruction on the care of children, from contributors whose experience and judgment entitle them to the highest consideration; but, as years roll on, new readers are looking for information and instruction on that most important of all subjects, "The Hygiene of Infancy and Childhood."

In the foundling institutions and other public charities in France, 900 out of every 1,000 children die every year. In Germany, Italy, Spain and other countries the mortality is equally great. How is it here in New York and other large cities throughout the country? About 63 per cent. of all the deaths that occur annually are of children under five years of age. Children under five years of age form about one-tenth of the whole population, so that 63 per cent. of all the deaths in the community every year occur in one-tenth of the population. But this is not all. If reference is made only to the poorer classes, in which cold, hunger, bad air, filth and all the other causes that contribute to ruin health and destroy life, it will be found that the actual mortality would not be much less than in the public institutions in Europe, and, perhaps, in our own country. And why is this? Children may be divided into three classes, according to the position they occupy severally, and the means of affording the care necessary for making them useful and healthy citizens within the reach of their parents. The wealthy and those in easy circumstances, are surrounded by everything that can contribute to health or comfort. The poor, that are born with less than the necessaries of life around them, that grow up scantily clothed and badly nourished, and are ever afterward doomed to feel the influence of poverty in their early years. The unfortunate, that lose their natural protectors in their tender years, and those cast away, those abandoned by the parent who should, if they yielded only to their animal instincts, be their natural protectors.

Much of the trouble depends on the parents themselves, no doubt, but most on the faulty care that is bestowed on their children. Faulty nutrition is one of the most potent causes, but many children that are overfed actually die of starvation. Nutri-

tion is perverted. They suffer from innumerable diseases inherited or acquired; the various forms of scrofulous disease, chronic catarrh—nasal and bronchial—skin diseases, obstinate eczema, psoriasis, herpes, ulcers. Diseases of the bones, as caries, necrosis and osteo-periostitis. Diseases of the articulations, glandular swellings of the joints. Diseases of the lymphatic glands of eyes and ears, so that the poor sufferer might well exclaim

> "Why all this heat of skin?
> Why so much pain within?
> What makes me get so thin?"

and the answers would be as numerous and as various as are the diseases from which it is anxious to be relieved.

There is no slavery more despotic than that exerted by social or by national customs. Many of these traditions bear the sanction of thousands of years. There is no evil that it is harder to root out. Their absurdity, their unreasonableness offer no resistance to their continued sway. Fashion, too, the conventional rules that govern society, are perhaps equally tyrannical. If none suffered from this cruel despotism but those who yield voluntarily to its commands, there would be comparatively little room for complaint; but, alas! it rules us from the cradle to the grave.

Where will you find a greater despot than the ignorant and generally conceited nurse who has the first care of the newly-born child? She knows all the laws of hygiene and their application to infancy better than the most experienced physician. She insists on keeping its head warm and its extremities cool; it is fed whenever it cries, for it must be kept quiet so as not to disturb the mother; if it cries during the night, a little soothing-syrup will do, for the nurse needs rest. Generally, during her administration everything works admirably; the mother believes that she is blessed with a quiet child, and looks forward to her recovery, hoping that she will be spared many a restless night. The doctor believes that his instructions have been carried out to the letter. Everything goes on pleasantly during the period of convalescence. The mother assumes charge of her child, to find that it is restless and fretful. It sleeps badly, suffers from colic, sprue or constipation; starts frightened from its sleep as one awakened from a terrible

dream. No attention is spared to restore its former quiet; the traditional remedies are applied without effect. The patient grows no better, and the doctor is called in again. A careful inquiry is made—an empty bottle that once contained soothing-syrup is found—that panacea for all the ills to which helpless infancy is subject. Natural sleep returns gradually, and with it appetite and health. The mother has been made much wiser; the doctor gained his experience years ago.

The poor child is destined still to suffer. It was hoped that a change of nurses would bring permanent relief; but no, family traditions cannot be set aside. The child sleeps from early morning until late in the afternoon; it awakes hungry and is fed until it refuses more. Soon the excess of milk begins to ferment. Flatulence disturbs the stomach and bowels; the curdled milk is thrown off and the child is again hungry. The same process is repeated, and the bowels soon become hard and distended. The child cries from pain, but the mother fancies it is hungry and gives it more milk, and thus the struggle goes on until the little sufferer towards morning goes off into an unquiet sleep from mere exhaustion. Day after day, the child passes through the same routine. It is carried in the arms all night; sometimes it is shaken, and when the mother is tired it is bounced on the knee. The little sufferer becomes exhausted, emaciated, and if warm weather comes on while it is in this state, diarrhœa, cholera infantum and all the nervous affections that are likely to accompany the period of teething, follow in train.

The infant's clothing is unnatural and injurious; the movements of the limbs are restricted and their natural development prevented.

The sleeping apartments are unhealthy, the air impure, the light either entirely excluded or the child is placed in the glare of the sun. If it suffer pain, it is unable to turn away its head; but generally there is a marked disposition to fix the eyes on the light. Under such circumstances, if the head cannot be turned, the eyes are strained, and certain degrees of strabismus may be imperceptibly induced.

If such evils follow the tender, though injudicious care of parents, what can be expected in families deprived not only of all the comforts, but even of the necessaries of life? With the

same slavish obedience to custom, and with perhaps less intelligence in the management of the child, and in adapting scanty means to meet the necessary wants, the sufferings must be infinitely increased.

But what shall we say of our public institutions? Who have charge of them? Are the managers competent to organize such institutions and carry out the details with advantage to the public interest, and to the helpless children committed to their care? Many of them are mere sinecures, bestowed upon mere political workers who know nothing about the duties they ought to perform, and generally care less. Others are managed by intractable gentlemen, who never knew how to do anything except accumulate a fortune. Their wealth gives them importance, and because they have been successful in amassing fortunes, they think themselves gifted with all knowledge. These people work themselves into positions in almost every institution; but they contribute liberally. No wonder that they insult or show disrespect for the professional man who has spent a lifetime in acquiring the knowledge which he is now called upon to put in practice; they have been accustomed all their lives to treat their employees in the same way, and they cannot show any respect for professional skill.

The practical hygiene of infancy will serve for subsequent consideration.

T. P. CORBALLY.

ANGLO-SWISS MILK FOOD.—To Anglo-Swiss Milk Co.: "I have employed your Milk Food in the hospitals here, and so far as my experience goes I do not hesitate in preferring it to Nestlé's food, unless it be in cases where circumstances may render it desirable that food be thick in consistency through much undissolved starch. The children take your food very willingly, and in general it agrees well with them. I therefore see that it is kept in stock by the chemists in Jena, for the children in the hospitals here, and have also introduced it in my private practice in place of Nestlé's food.

From a letter of Prof. Fürbringer, of Jena, 27th October, 1880.

EDITOR'S TABLE.

NEW YORK'S PUBLIC SCHOOL BUILDINGS.

On a recent report of the sanitary inspection service of the Health Department, that seventy-six of the school buildings are in a condition dangerous to the health and lives of the school children, the Superintendent of the said buildings is said to be aroused to the importance of doing something to keep off the "interference" of the Health Department. It is no new thing to the Superintendent of School Buildings or to any one else who has taken interest in the subject, that many of the school-houses of New York are unfit for human occupancy; that, so far as healthiness is concerned, they are greatly inferior to the general run of private stables; and that this has been their normal condition for many years. And, moreover, no one has been more familiar with this condition in general terms than the Health Department, through the registration of deaths from diphtheria and other filth diseases, traceable to the school-houses. Unfortunately, it has been the general practice of the Health Department in the use of an inspection service, except for a few weeks in midsummer, to trace unsanitary conditions by following the trail of disease and death. And owing to a most unaccountable interpretation of the health laws, the public schools have been excepted even in this fatal policy, because, forsooth, the Board of Education has been looked upon by the Health Department as a co-ordinate branch of the city government, as if that is any evidence of sanitary knowledge in the Board of Education, any more than among the same number of citizens engaged in ordinary business pursuits, or the supervisors of a multitude of persons subject to conditions involving the necessity of sanitary supervision under any other circumstances. It has not been the practice of the appointing power of such officers to make sanitary knowledge a condition of competency, and by what construction of the health laws the public schools have been practically exempt from the surveillance of the Health Department, which is made the custodian of the public health, is beyond our comprehension.

The public school buildings, like the New York tenement

houses, are exceedingly unhealthy, not by reason of their being what they are in name, or the use to which they are put, but because of their filthy conditions. There is no reason why a school-house or tenement-house should not be as healthy as any other house, if it is kept clean, warm, well ventilated and protected from filthy surroundings. All these conditions are practical; the health laws contemplate that they shall be made so, and for their negligence the Health Department should be held responsible to the public.

MEDICAL REFORM NECESSARY FOR THE HEALTH OF THE PEOPLE.

In virtue of the universally recognized truth by all disinterested people in the United States, that the prevalence of quackery is a fruitful source of disease and premature death, the Medical Society of the County of Erie (N. Y.) has taken the lead in an effort to establish such a reform in the standard of Medical Education in the State of New York, as will, if established by law, have the effect of greatly promoting the public health.

In a *memorial* asking the co-operation of the medical profession, in the effort to secure the passage of the proposed Act to establish the Medical Faculty of the State of New York, the Erie County Society urges that the attention of each member of the Legislature be suitably directed to the following facts:

1. That the present system of licensing physicians does not command the respect and confidence of either the profession or the people.

2. That the cardinal defect in that system is the fact that diplomas of medical colleges are licenses to practice medicine.

3. That, as a general rule, medical colleges are private corporations, operated by, and in the interests of, a few individuals, whose personal and pecuniary interests—acting with the tendencies of competition—have brought about a state of affairs in which a diploma has practically ceased to furnish any reasonable presumption of respectable professional acquirement.

4. That the graduates from the medical schools of this country, during the year last past, were nearly four thousand in number (3,975), being more than the number graduated during the same period by all the medical schools of the whole British Empire, France, Austria and Germany combined.

5. That, as a result of this system, the country is overrun with unlearned, incompetent persons, holding licenses to prac-

tice medicine, to the serious degradation of the profession and the detriment of the public health and welfare.

6. That the existence of this evil has recently been recognized by the legislative authority of the States of Alabama, North Carolina, Illinois, Minnesota, Missouri and West Virginia, and the remedy applied by the establishment, in each of these commonwealths, of a single licensing body after the form and manner of the faculty which this act would create.

7. That this system of placing the licensing power in the hands of a body directly responsible to the people, and entirely independent of, and disconnected from the teaching bodies, is the one which prevails in almost every civilized country in the world.

8. That the object of this proposed law is to strike at ignorance and incompetency, but that it in no way interferes with freedom of opinion or individuality of doctrine.

9. That, if enacted, it will in no way interfere with any person now engaged in the lawful practice of medicine, inasmuch as it excludes all such persons from its operations.

10. That the proposed law involves the State in no expenditure of money, neither now nor hereafter.

11. That, inasmuch as the evil complained of in this memorial is conceded by all, save those interested in its perpetuation —and as the plan here proposed is now in successful operation in six different States—inasmuch as this plan will not disturb any person now engaged in the lawful practice of medicine, and as it works no wrong to any citizen of the State—inasmuch as it imposes no burdens upon the State treasury, and would be simply adopting the usage of other enlightened countries—and inasmuch as its sole object is to secure to the people the services of a worthy and efficient medical profession, in the belief that such services would promote the public health and public welfare—for these reasons and in the name and behalf of the Medical Society of the County of Erie, hearty co-operation in the effort to secure the passage of this measure is asked.

MEDICAL PRACTICE IN MINNESOTA.—In virtue of the act to regulate the practice of medicine in this State, the State Board of Medical Examiners thereby constituted (the Faculty of the Medical Department of the University of Minnesota), has issued a circular letter with full directions for the benefit of that portion of the profession who have not yet complied with the provisions of the act—given in full in THE SANITARIAN, Vol. XI., p. 527. The Board advises all physicians falling under the exemption clause to appear on record with the clerk of court to the best advantage within their power. Non-resi-

dent physicians whose field of practice extends into Minnesota territory are also amenable to this act. The leading duties of the Board, in addition to granting certificates and licenses, is the censorship of all the colleges having graduates in this State. It will be the aim of the Board to recognize only schools that maintain a high standard in all that the term implies.

Charlatanism is recognized by placing the vendor of medicines upon street corners upon a peddler's rating, they being required to pay a license for vending their nostrums. Druggists will be amenable to the law if they assume the professional role.

It is by the enactment and enforcement of laws like this, that the status of the medical profession will be raised, and not by quarrels about ethics.

STATE AND LOCAL BOARDS OF HEALTH REPORTS.

IOWA.—The first registration report, for the year ending October 1, 1881, gives the population of the State in 1870, 1,194,020, and in 1880, 1,624,615, showing an increase of 430,595, or 36+ per cent. For 1881—

Marriages reported—regarded as incomplete—12,795: 15 per 1,000.

Births reported (including 905 still births), 29,397: 18 per 1,000.

Deaths recorded, 10,668: 6 per 1,000—but it is estimated that not more than 40 per cent., or two-fifths of the deaths, were recorded; and that the rate was probably about 16 per 1,000. More than half were from zymotic diseases. 585 deaths are recorded from "unknown, or undefined causes"—and among these, "in many cases of coroners' reports of deaths, it is impossible to determine whether the death was accidental, suicidal, or homicidal; and if this is mentioned, then the mode of death is omitted, as when cases of suicide are simply reported, 'died by his own hand'"—a good illustration of the absurdity of coroners' inquests generally in the United States, and how important it is that they should be wholly abolished, in favor of the far more sensible system now practiced in Massachusetts and a few other States.

LOUISIANA.—Measures instituted by the Board of Health for

the arrest of small-pox in New Orleans during the years 1880, 1881, 1882 and 1883, by Joseph Jones, M.D., President of the Board of Health, State of Louisiana. This report of twenty pages gives in detail an account of the efforts made in the time specified for the suppression of an unusually protracted epidemic, to be accounted for chiefly by reason of the large proportion of persons not vaccinated, and the difficulty of overcoming the prejudice against vaccination from ignorance of its benefits. The epidemic appears to have begun in May, 1880—one case. The next case occurred January 11, 1881—a woman, steerage passenger on board the steamship *Nurnburg*, from Bremen, having on board a crew of 85, and 173 passengers. Of 257 persons vaccinated on this steamer by the quarantine physician, 101 took the vaccine disease—showing the extent of neglected vaccination. The disease again appears to have been arrested at the threshold. But it again and again cropped out in one place and another, giving for the year 1881, 26 cases. During the early months of 1882, the public schools were inspected, and "those showing evidences of improper vaccination were directed to be re-vaccinated." In 1882 there were, of cases—388 white, 705 colored—1093; of deaths—116 white, 299 colored—415. Of free vaccinations by the Sanitary Inspectors of the Board of Health there were, in 1881—1,370; 1882—4,725; 1883 (first nine months) 5,549—11,644. In 1883, January to September, inclusive, there were, of cases reported, 1,402 white, and 1,819 colored—3,221. Deaths, 466 white, 739 colored—1,205. Details are given of its distribution in the several sanitary districts of the city, and the disposal of the cases. From a review of the movement of the epidemic to what the President of the Board seemed an approximate end —" a reduction of the weekly mortuary of small-pox from a maximum of 86 for week ending April 7, 1883, to the present minimum of three for week ending October 20, 1883, a point which has not been reached since November, 1882"—a number of conclusions are deduced, satisfactory to the Board, and resolutions adopted, assuring to the public.

THE AUXILIARY SANITARY ASSOCIATION OF NEW ORLEANS.

At the regular weekly meeting of this Association, December 6, the *Flushing Committee* submited its annual report, of which the following is an abstract:

Hours of actual duty.....4,460¼
Gallons water elevated and distributed.....816,684,438
Expenses, coal oil, packing tools, repairs, fire insurance, engineers, laborers' pay-roll, etc., for 12 months.....$9,217.89

This period of the year is selected for the report, in order that the outlay may be placed before the City Council, which prepares it at this season for the ensuing year. For the year 1881, the Administrator of Improvements appropriated to the Association toward the running expenses of the pumps $3,000, of which $2,000 only was paid, leaving a balance of $1,000 for 1882 yet unpaid.

The Association was placed upon the budget for..$10,000.00
Of which there has been collected 6,666.67

showing a balance due by the city for 1881 and 1882 of $4,333.33 which amount, when realized, will about repay the Association for expenses of the pumps for those years.

The Council failed to make any appropriation for the year 1883 toward the pumping expenses incurred. $9,217.89
Calculating the same expenses for 1884.....9,217.89

will make a total of.....$18,435.78.
expenditures for which no provision has been made by the city.

Experience has demonstrated that the unchecked service of these pumps is of vital interest to the health, comfort and prosperity of the whole city.

The report of the sanitary director showed that 3,186 premises had been visited during the month of October and 11,005 houses during November; number of persons vaccinated in October, 733; in November,2,033; that it was gratifying to note a decrease in the number of cases of small-pox; in September 76 cases had been reported, in October 50, and in November 38, and so far in December, 9.

BROOKLYN, N. Y.—Commissioner Raymond reports for twelve months ending November 30, 1883, a total mortality of 13,833, 1,180 less than for the calendar year 1882. Assuming that this total, 13,833, fairly represents the mortality of 1883, and estimating the population to be 624,118, the death-rate per 1,000 has been 22.16. In 1882 the number of deaths was

15,031; and, on an estimated population of 604,356, the rate per 1,000, 24.84—a difference equal to 1,600 lives in favor of 1883. The decrease of mortality in 1883 is attributed chiefly to the decline in infant mortality—amounting in children under five years of age to 1,229; and in deaths from zymotic diseases, upwards of 2,000. The mortality of children under five, in 1883, was 5,907; in 1882, 7,136. Deaths from zymotic diseases in 1883, 2,700; in 1882, 4,880. From diphtheria in 1883, 426; in 1882, 632. From measles in 1883, 542; in 1882, 892. From diarrhœal diseases in 1883, 3,927; in 1882, 4,500. From small-pox in 1883, 2; in 1882, 12. Per contra, from typhoid fever in 1883, there was a slight increase—96; in 1882, 83. From consumption in 1883, 1,840; in 1882, 1,806.

The enforcement of the plumbing law, by which 3,451 buildings, occupied by not less than 20,000 persons, have had the benefit of improved plumbing; the food-inspection service, by which 23,578 pounds of meat have been condemned and sent to the offal dock; 27,543 quarts of milk tested, and over 3,000 quarts condemned; cow-stable nuisances abated, and the health of cows promoted; and numerous filthy pumps and wells abolished, are the chief subjects enumerated in promotion of the public health. But—

Unsanitary conditions of much magnitude, and dangerous to the public health, require prompt attention. Prominently among these the Commissioner calls attention to one of the largest sewers in the city—the Knickerbocker Avenue—which has for many years had its outfall on a mudflat, now being encroached upon by an extending population. Another subject which is being constantly forced upon the Health Department, is the

"Lack of sewerage in the outlying wards, which are rapidly being built up. There are at present but two methods open to builders: One is to drain into the street gutter, the other into cesspools. The drainage into the gutter causes pools of offensive and stagnant water, which soon become such a nuisance as to demand the interference of this department. If the waste-pipes are connected with cesspools, these are soon filled, as the Sanitary Code requires all cesspools to be water-tight, and a large expense must be incurred in their periodical and frequent emptying. An additional nuisance is also created by the construction of yard privy vaults, which are required in all cases where sewers do not exist in the street. Nothing but the

construction of sewers will remedy these evils, which, if uncorrected, will seriously imperil the public health.

"Another matter of sufficient importance to require the attention of the municipal authorities is, the location of slaughter houses in sections of the city which are either densely populated or are rapidly becoming so. The necessity for the discontinuance of some of the present slaughtering places has been long felt by this department, and in past years many fruitless efforts have been made to accomplish their removal to the water front. The nuisance incidental to their very existence, such as the driving of animals through the streets, endangering human life and defiling the roadway, and oftentimes the sidewalk, together with the bellowing and bleating when they have reached the place of destination and are herded preparatory to slaughter, render it essential for the welfare and comfort of the community that the present methods should be discontinued at the earliest practicable date. Some faint idea of the evils possible under the present arrangement may be obtained by remembering that the number of animals slaughtered in the city during the eleven months was 173,624, most of which had been driven through the streets of the city. It is with this object in view that a public market, with an abattoir attached, meets with the hearty indorsement of this Department."

"REX MAGNUS" AND "VENETIAN RED" AS FOOD PRESERVATIVES.—Dr. G. H. Bartley, the analytical chemist of the Brooklyn Health Department, has submitted a report to Commissioner Raymond, M.D., on the qualities and dangers of these substances as food preservatives. There are several well authenticated cases, the report says, of poisoning from their use. "Venetian Red" is used by bologna sausage makers to keep the meat free from taint, and to give it a bright color. "Rex Magnus," Dr. Bartley says, he has found to be used extensively to preserve milk and other articles. It is composed principally of borax and boracic acid. The quantity required for the preservation of milk is such as to give to each quart of milk about ninety grains. It is tasteless and odorless. As a child one year old will consume a quart of milk in twenty-four hours, it is unsafe to allow the use of the preservative. The Doctor says stale milk may often be sent to market that has been kept by the use of this preparation two or three days.

Health Commissioner Raymond issued an order prohibiting the use of these materials in articles to be sold for human food.

FOUR WEEKS, ENDING DECEMBER 1, 1883. Correspondents under this head are requested to send reports promptly.	Total Deaths.	Deaths under 5 years.	Lung Diseases.	Diphtheria and Croup.	Scarlatina.	Measles.	Whooping Cough.	Fevers.	Small-pox.	Diarrhœal Diseases.	Annual rate per 1,000.
Burlington, Vt., 11,364	18	7	4	5	..	..	..	..	..	1	20.5
Boston, Mass., 427,940	613	193	184	50	24	1	2	17	..	24	18.5
Lowell, Mass., 68,000	79	27	25	6	..	..	..	..	..	1	14.1
Lynn, Mass., 38,284	59	13	15	1	..	..	..	5	..	..	16.6
Somerville, Mass., 27,651	26	7	11	3	..	..	1	..	..	1	12.1
Worcester, Mass., 58,295	96	26	14	6	4	..	..	..	..	3	21.3
Providence, R. I., 116,755	157	40	49	5	4	2	..	6	..	2	17.0
New York, N. Y., 1,325,092	2212	730	680	148	33	20	16	104	..	66	21.4
Brooklyn, N. Y., 624,118	859	289	288	65	23	3	11	25	..	21	17.9
Buffalo, N. Y., 200,000	220	71	38	8	18	..	..	3	..	15	13.8
Rochester, N. Y., 101,900	102	24	22	9	..	1	..	6	..	1	12.8
Albany, N. Y., 90,903	154	65	27	11	15	..	2	7	..	4	21.9
*Auburn, N. Y., 25,000	23	4	6	1	..	..	1	2	..	..	16.5
Yonkers, N. Y., 21,000	30	7	7	2	1	..	..	8	..	..	18.1
West Troy, N. Y., 13,000	23	8	6	6	..	..	..	1	..	..	23.0
Hudson Co., N. J., 204,000	318	111	78	21	10	..	..	15	..	5	20.3
†Philadelphia, Pa., 907,041	727	226	165	68	10	..	4	20	3	9	20.7
†Pittsburgh, Pa., 175,000	106	50	31	9	2	1	..	4	..	..	18.4
Erie, Pa., 27,730	36	9	4	1	1	..	..	2	..	2	16.8
Wilmington, Del., 50,000	63	20	16	6	4	..	..	4	..	..	16.3
†Cincinnati, O., 280,000	186	58	43	8	1	..	1	5	..	8	17.2
§Cleveland, O., 194,000	53	..	7	3	3	..	1	4	..	1	14.2
Detroit, Mich., 135,000	206	84	34	39	2	..	2	9	..	1	19.9
‡Indianapolis, Ind., 100,000	95	37	24	4	1	..	..	3	..	..	13.0
Evansville, Ind., 40,000	36	13	10	..	..	..	..	6	..	1	11.7
Rock Island, Ill., 11,650	8	4	1	2	..	..	..	..	..	..	8.8
Chicago, Ill., 560,693	724	309	145	81	20	3	2	48	..	22	16.7
St. Louis, Mo., 400,000	535	183	103	68	12	.	..	31	1	23	17.4
Milwaukee, Wis., 130,000	174	88	35	11	10	..	1	7	..	1	17 4
Omaha, Neb., 45,200	52	22	8	16	3	..	..	3	..	..	14.9
Salt Lake City, 22,000	26	7	5	..	..	..	..	5	..	..	15.3
San Francisco, Cal., 235,000	367	87	112	5	1	..	..	27	..	6	20.2
Minneapolis, Minn., 90,000	98	31	29	17	..	..	1	7	..	5	14.1
Baltimore, Md., 408,520	595	215	133	55	23	8	8	34	..	9	18.8
†Dist. of Columbia, 194,910	188	70	64	3	1	15	6	4	..	7	27.8
Richmond, Va., 66,000	125	28	30	4	1	..	1	5	..	5	22.5
Lynchburg, Va., 20,240	48	23	4	..	5	2	..	..	..	3	29.2
New Orleans, La., 221,084	632	183	115	9	4	..	6	¶53	29	60	39.3
Jacksonville, Fla., 10,000	11	4	..	..	..	..	..	..	.	2	13.5
‡Nashville, Tenn., 50,000	86	27	26	2	..	..	..	3	3	2	20.6
‡Mobile, Ala., 31,295	68	23	12	1	..	..	..	..	..	1	21.7
‡Paterson, N. J., 52,000	93	34	18	10	9	..	..	5	..	1	21 0
‡St. Paul, Minn., 42,000	101	41	15	21	..	..	1	7	..	..	28.4

* 3 weeks; † 2 weeks; § 1 week; ‡ Month of November; ¶ Yellow Fever, 1.

LOCALITY. — Week Ending Nov. 24, 1883.	Total Deaths.	Deaths under 1 year.	Bronchitis and Pneumonia.	Diphtheria and Croup.	Scarlatina.	Measles.	Whooping Cough.	Typhoid and Typhus Fevers.	Small-pox.	Diarrhœal Diseases.	Annual rate per 1,000.
London, 3,995,814	1670	367	431	42	41	49	29	35	1	27	22.0
Liverpool, 566,753	262	56	..	2	4	9	4	9	1	3	24.1
Glasgow, 515,590	289	51	82	8	24	1	11	2	..	5	29.1
Birmingham, 414,846	162	34	..	2	3	6	1	..	..	3	20.4
Dublin, 349,685	213	35	45	..	16	..	6	1	..	..	31.7
Manchester, 339,252	206	46	..	2	5	7	4	..	..	4	31.7
Leeds, 321,611	153	44	..	2	29	..	2	3	..	1	24.8
Sheffield, 295,497	143	33	..	..	9	2	5	1	..	3	25.3
Edinburgh, 235,946	115	21	21	4	6	7	1	..	..	3	25.3
Belfast, 214,022	107	17	27	1	5	..	3	..	..	2	26.0
Bristol, 212,779	93	28	..	..	2	..	1	3	..	2	22.8
Bradford, 204,807	71	16	..	..	2	1	..	..	..	1	18 1
Hull, 176,296	69	14	..	..	1	..	1	3	..	1	20.4
New Castle, 149,464	77	19	..	1	7	3	2	2	..	2	26.9
Havre, 105,867	68	8	8	2	1	..	1	3	..	3	33.4
Reims, 93,823	48	10	4	1	..	2	..	1	1	3	26.6
Nancy, 74,954	48	13	3	..	..	2	..	2	..	2	33.3
Breslau, 288,000	232	45	9	7	..	8	..	2	..	7	29.4
Cologne, 148,640	73	25	6	..	1	..	3	3	..	..	25.5
Frankfort, 143,300	38	4	2	..	..	..	2	1	..	..	13.8
Hanover, 128,500	57	15	7	4	4	..	..	1	..	1	23.1
Bremen, 117,577	34	17	7	..	3	..	..	..	..	2	15.4
Dantzic, 114,484	54	15	6	..	..	..	1	1	..	3	24.5
Stuttgart, 109,564	38	14	2	2	1	..	2	1	..	2	18.0
Strassburg, 108,706	33	9	3	..	..	..	..	..	..	2	15.8
Düsseldorf, 104,201	48	19	4	..	..	..	..	1	..	1	24.0
Nuremberg, 103,255	47	10	7	..	3	..	2	2	..	..	23.7
Chemnitz, 102,713	73	26	2	6	..	8	..	..	..	1	37.0
Madgeburg, 101,500	47	13	1	4	2	1	..	2	..	..	24.1
Elberfeld, 100,400	38	13	3	1	4	1	..	..	..	..	19 7
Barmen, 100,000	41	8	4	2	1	..	4	..	..	2	21.3
Brussells, 166,351	73	14	11	1	1	..	..	..	3	3	22.8
Week Ending Nov. 17, 1883.											
Amsterdam, 350,202	193	..	..	35	2	3	2	2	..	..	28.4
Rotterdam, 162,139	75	..	..	..	2	..	..	1	..	1	24.1
The Hague, 127,932	45	..	..	1	..	..	..	..	..	..	18.2
Lyons, 376,613	128	..	21	..	..	..	1	2	3	3	17.7
Berlin, 1,192,203	573	153	38	87	18	6	6	6	..	15	25.0
Hamburg, 479,706	192	59	30	3	1	9	5	4	..	8	20.8
Vienna, 749,762	351	82	20	7	2	10	3	..	2	23	24.3
Buda-Pest, 411,576	169	33	13	4	5	..	..	2	4	10	21.4
Prague, 271,807	153	33	13	3	3	1	2	3	26	6	27.5
St. Petersburg, 929,525	420	112	59	27	9	3	2	13	1	40	22.8
Bucharest, 200,000	98	35	22	5	3	1	..	3	..	6	22.7
*Paris, 2,239,928	981	166	103	44	1	7	6	31	6	69	22.9
†Bombay, 773,196	216	..	..	..	..	..	..	58	..	§59	26.0

* Week ending Nov. 22, 1883; † Week ending Nov. 6, 1883; § Cholera.

LITERARY NOTICES.

HEALTH AND HOW TO PROMOTE IT, FROM INFANCY TO OLD AGE.—BY Richard McSherry, M.D., Professor of Principles and Practice of Medicine, University of Maryland; Pres. Med. and Chirurgical Faculty of Md.; Member of Amer. Med. Association, Baltimore Academy of Medicine, etc.; Author of "El Puchero, or a Mixed Dish from Mexico;" "Lectures and Essays on Various Subjects;" "Early History of Maryland, Mexico and Mexican Affairs;" "Health and Happiness," etc., etc. SECOND EDITION. New York: D. Appleton & Co.

It affords us much pleasure to notice the Second Edition of this most readable and practical of American publications for the individual, the family, the teacher and the medical student. —Written by a physician of large and varied experience, the various subjects of sanitation are discussed in both their physiological and their pathological conditions, with reference to the pursuits and habits of life at all ages under different vicissitudes, and no one interested in the promotion of his own health, or the health of those in any degree subject to his influence, but may find food for thought here, strengthening in body and mind—promotive of health and happiness.

MEDICAL RECORD "VISITING LIST" for 1884, contains about everything necessary in a pocket memoranda of professional visits. The arrangement of rulings, etc., is admirable.

The work is unencumbered by unnecessary text, and altogether it is a compact, concise and handsome book.

THE COTTAGE KITCHEN: A COLLECTION OF PRACTICAL AND INEXPENSIVE RECEIPTS. By Marion Harland. 12mo, pp. 276. New York: Charles Scribner's Sons. Price $1.00.

Proverbially, the average American housewife is the most successful food-spoiler in the world. To do away with this reproach is the object of this book. Its mission will be accomplished just in proportion as American housewives will make themselves familiar with its contents. It is no less applicable to those who can afford to do without practical knowledge in the preparation of comestibles, except as they should be prepared to the taste, than to those who will find in it a mine of gold in its

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> "There at a board by tome and papers sat,
> With two tame leopards crouched beside her throne,
> All beauty compass'd in a female form,
> The Princess."

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NUMBER 171.

HOSPITALS FOR CONTAGIOUS DISEASES.

Their Proper Location, considered more especially in regard to the Safety of Neighboring Dwellers from the Infection of Small-pox.

By R. J. FARQUHARSON, A.M., M.D., Secretary Iowa State Board of Health.

No one doubts the great usefulness of these institutions, which, for brevity's sake, shall be called in this paper by the old and significant, but objectionable, name of pest-houses. But when it comes to their location, especially in the suburbs of one of our rapidly growing towns or cities, a very vexed question arises.

The question has two very different aspects, according to the different standpoints from which it may be regarded. Sanitary authorities, and physicians generally, having no great dread of small-pox, partly from professional habit and familiarity with the disease, but mostly from an abiding and invincible faith in the entire protection afforded by vaccination, would place the pest-houses as near as possible, both for their own convenience in visiting the inmates, and for the superior facility and safety of the transportation of the latter. On the other hand, the community generally, having a superstitious horror of the disease, and being conscious, in many instances,

of their neglect of vaccination, or, if vaccinated, doubtful of its protective powers, would wish the pest-house to be as far out of the city as possible, both on account of safety of persons and of the injury to the value of property.

Just what is the limit of safety to surrounding dwellings from infection by small-pox has never been definitely settled, either by experiment or observation. In Johnson's Cyclopædia it is stated that persons have been infected by the "volatile contagion" across a river 150 feet wide. This fact, if it is indeed a fact, has been quoted in a judicial decision in this State. But the medical mind, by general consent, has been always inclined to reject all such suggestions of infection through the air at long distances, and account for these apparent cases, or attempt to account for them, by some kind of actual material contact or contagion—an explanation so far-fetched in many cases, it must be admitted, as to require for its admission fully as much credulity or imagination as the other.

But now, fortunately, we are in the possession of such well observed and well authenticated facts, as to be able to make a considerable advance in the solution of this vexed question, but with the result of a great disturbance, if not entire overthrow, of current medical opinions.

For a proper understanding of the subject, it may be proper to call attention to the peculiar virulence of the small-pox contagion, which seems to be almost *sui generis*, having no like or companion.

"The poison of typhus exanthematicus is very readily got rid of by free ventilation, by means of which it must be at once diluted and oxygenated, so that a few feet give, under such circumstances, sufficient protection. This is also the case with the poison of oriental plague, while, on the other hand, the poison of small-pox and scarlet fever will spread in spite of free ventilation, and retain their power of causing the same disease for a long time."—*Parkes' Hygiene*, 5th ed., p. 117.

This fact of the superior virulence of small-pox, even over scarlatina, will be more apparent further along, when the recent observations in England, on a most extended scale, are narrated, which show that a space of as little as forty feet is sufficient protection against the poison of all diseases usually isolated in hospitals, with the sole exception of small-pox.

OBSERVATIONS IN ENGLAND IN 1880–1.

In 1880, by order of the Local Government Board (which is the English National Board of Health), Dr. Thorne made a series of observations, which were extended into 1881, upon the "Use and Influence of Hospitals for Infectious Diseases." When Dr. Thorne's inquiry was planned, it was not intended that it should extend to the metropolis. But at the end of 1880, when Dr. Thorne's inquiry was in an advanced state, representations were received by the Board that cases of small-pox were occurring in an exceptional fashion round certain of the metropolitan asylum board hospitals; and it was felt that Dr. Thorne's experience on this subject, derived from hospitals in the provinces, ought not, without further inquiry, to be accepted as representing the whole truth for hospitals in London.

Accordingly, Mr. W. H. Power was associated with Dr. Thorne for the particular purpose of examining the facts for the neighborhood of Fulham Hospital.

INFLUENCE OF URBAN AND SUBURBAN, OR RURAL HOSPITALS OUTSIDE OF LONDON.

As to Dr. Thorne's report, the following facts are deduced:

1. Of the 286 hospitals in England for infectious diseases, 67 were inspected, in use by urban, by rural, and by port sanitary authorities; of every variety of locality, size and construction; some thoughtfully devised on a scale adapted to the needs of their districts, and reckoned by those who had provided them as among the most valuable defenses of these districts; others ill-placed or on an altogether insufficient scale, or badly planned, doing duty in default of better, though of flimsy, material and hurried construction.

2. Whether or not any injurious effects upon the health of a population could be traced to the presence of a hospital in its midst was the further problem which Dr. Thorne's inquiry was directed to solve, and his results are chiefly negative. In several cases he found infection communicated through some fault of administration. He also, in the case of small-pox, discovered two instances where infection had appeared to spread from a hospital in a row of houses to other houses, in a way that suggested the conveyance of the infective matter through the atmosphere rather than by means of persons or things. In

many other instances the same disease, small-pox, being in question, Dr. Thorne heard of no extension of infection to neighboring streets and houses, in spite of the best inquiries he and officers of health could make. This is all; for the rest, Dr. Thorne having to tell many a story of hospitals in which the circumstances of site, of construction and of management, might have been better than they were, has nothing to record of fevers, scarlet, typhus, enteric, or other infectious diseases, spread from the hospital, as such, to its neighborhood. In regard to the danger from these diseases, Dr. Thorne says: "My inquiry will tend to show that in well administered hospitals, having an open space of some forty feet between the hospital wards and any neighboring thoroughfares or buildings, no risk of the spread of infection from scarlet fever, typhus, and enteric fever need be apprehended."

3. As to the two cases of small-pox from hospitals. These occurred at Maidstone, Kent County, an urban, and at Stockton, Duham County, also an urban hospital; both being houses rented for the purpose, both being in a row of houses, and in the case of the former, another row of houses were only distant twenty-three feet, across the street. In both instances the hospitals in question were buildings which ought never to have been used by a sanitary authority for isolation of cases of infectious diseases, forming part, as each one did, of a row of dwelling houses, and being in each case so situated that the patients had to be removed from the ambulances in the public thoroughfare.

4. Finally it is to be remarked that all of Dr. Thorne's evidence in regard to safety to neighboring dwellings from infectious diseases is of a negative character. Now, although negative evidence is valuable as to the spread of such diseases as scarlet fever, typhus, diphtheria, enteric fever, etc., against which there is no protection but a previous attack, and even that is not always a preventive, yet when applied to small-pox it loses most of its value, becomes indeed comparatively worthless, owing to the possible fact of the complete protection afforded by vaccination to a population near a small-pox hospital. Dr. Thorne notes this himself, by saying: "Negative evidence, however, of this character loses much of its value in the case of small-pox, by reason of the large amount of vaccination which is carried out in most districts when small-pox be-

comes prevalent. That this source of error must be taken into consideration with regard to Nottingham, is within my personal knowledge, and in forming any conclusion as to the small extent of the spread, if any such spread took place, under circumstances such as obtained at Maidstone, regard must be had to the same point. Thus, in the latter place, nearly all of the residents in the immediate vicinity of the hospital were found to have been protected against the disease either by vaccination or a previous attack of small-pox."

SMALL-POX HOSPITAL IN LONDON.

From the report of Mr. W. H. Power, on the influence of the Fulham small-pox hospital on the neighborhood surrounding it, we learn the following:

1. Fulham Hospital is one of five similar structures erected by the managers of the Metropolitan Asylum District. It is in West London. The site comprises six and a half acres; it is a pavilion hospital, with ten wards, to accommodate 300 patients, and is administered in the most admirable manner. The hospital was opened for small-pox patients on March 10, 1877, and it continued to receive patients up to the time of Mr. Powers' inspection, January 17, 1881, and several weeks afterward, during which period 2,527 cases of acute small-pox were admitted.

Fulham Hospital occupies a site that, from the view point of medical knowledge at the time of its selection, was singularly free from objection.

With few exeptions there are not within 500 feet of the limits of the hospital grounds any inhabited dwellings. Outside the 500 feet limit, and up to the quarter mile radius from the centre of the hospital, houses, though more plentiful, number only a few hundreds; but beyond the quarter mile limit they encompass the hospital on all sides.

2. General result of inquiry:

(*a.*) There has been in each epidemic period an excessive incidence of small-pox in houses in the neighborhood of the hospital, as compared with more distant houses in Chelsea, Fulham and Kensington.

(*b.*) The percentage of houses invaded in the neighborhood of the hospital has become gradually smaller as the distance of the houses from the hospital has increased. This gradation has been very exact and constant.

(*c.*) Houses upon the chief lines of human intercourse with the hospital have not suffered more than houses lying in other directions from the hospital.

(*d.*) In point of time there has been a very marked relation between the varying use of the hospital and the manifestations of excessive small-pox in the neighborhood. This relation has not shown itself while the use of the hospital has been for convalescents only.

(*e.*) The appearance of excessive small-pox in houses around the hospital has never been delayed until the hospital has become full or nearly full. It has always been most remarkable at the time when admissions to the hospital were beginning to increase rapidly.

(*f.*) On comparison of different epidemics, an almost constant ratio is observed between the amount of the hospital operations and the degree of excess of small-pox in the neighborhood.

The following table shows admissions of acute small-pox to Fulham Hospital and incidence of small-pox upon houses in several divisions of the special area, during five epidemic periods:

CASES OF ACUTE SMALL-POX ADMITTED.	IN EPIDEMIC PERIODS SINCE OPENING FULHAM HOSPITAL.	INCIDENCE IN EACH ONE HUNDRED HOUSES IN SPECIAL AREA AND ITS DISTRICTS.				
		On total special area.	On small circle 0-¼ miles.	On 1st ring ¼-½ mile.	On 2nd ring ½-¾ mile.	On 3rd ring ¾-1 mile.
327	March, 1877 to the end, 1877	1.10	3.47	1.37	1.27	.36
714	Jan., 1878—Sept., 1878	1.80	4.62	2.55	1.84	.67
679	Sept., 1878—Oct., 1879	1.68	4.40	2.63	1.49	.64
292	Oct., 1879—Dec., 1880	.58	1.85	1.06	30	.28
515	Dec., 1880—April., 1881	1.21	3.00	1.54	1.25	.61
2,527	Five periods	6.37	17.35	9.20	6.16	2.57

The following figures will explain the illustrations, showing the area of infection. See Figures 1 and 2—following:

Epidemic period—1876 to 1877.

Period antecedent to the establishment of Fulham Hospital (March, 1876, to March, 1877).

Rate per 100 houses in area referred to:

Whole of three parishes, .41; special area—one mile, .15; other parts of the parish outside special area, .54.

Epidemic period—1876 to 1877.

Period subsequent to the establishment of Fulham Hospital (March, 1877 to end of 1877).

Rate per 100 houses in each area referred to:

Whole three parishes, .94; special area—one mile, 1.10; other parts of parishes outside special area, .86.

INCIDENCE OF SMALL-POX ON SPECIAL AREA AND ITS DIVISIONS.

Total special area, 1.10; on small circle 0-¼ mile, 3.47; on 1st ring ¼-½ mile, 1.37; on 2d ring, ½-¾ mile, 1.27; on 3d ring ¾-1 mile, .36.

Here there is abundant evidence, and that of the most positive character, that small-pox does disseminate its poison around a hospital as a focus to a distance in every direction of at least three-quarters of a mile, and that outside of any apparent human agency. How it happens, and how to prevent its recurrence in the future, are the urgent problems which are suggested for solution.

Seeking the cause we naturally turn first to the meteorological conditions, and of these the wind may be at once eliminated as a cause, for it is obvious that the incidence of small-pox radiated equally in all directions, even against the direction of the wind prevailing during the period of excessive incidence.

In the latter part of January, 1881, according to a table given by Mr. Power (Table E2, p. 343), there was a sudden outbreak of small-pox in the vicinity of Fulham Hospital, forty-one houses being invaded during the fortnight ending February 5th, in contrast with five for the preceding fortnight ending January 22d.

Now, referring to the Greenwich meteorological observations, what kind of weather is found about fourteen days pre-

NORTH.

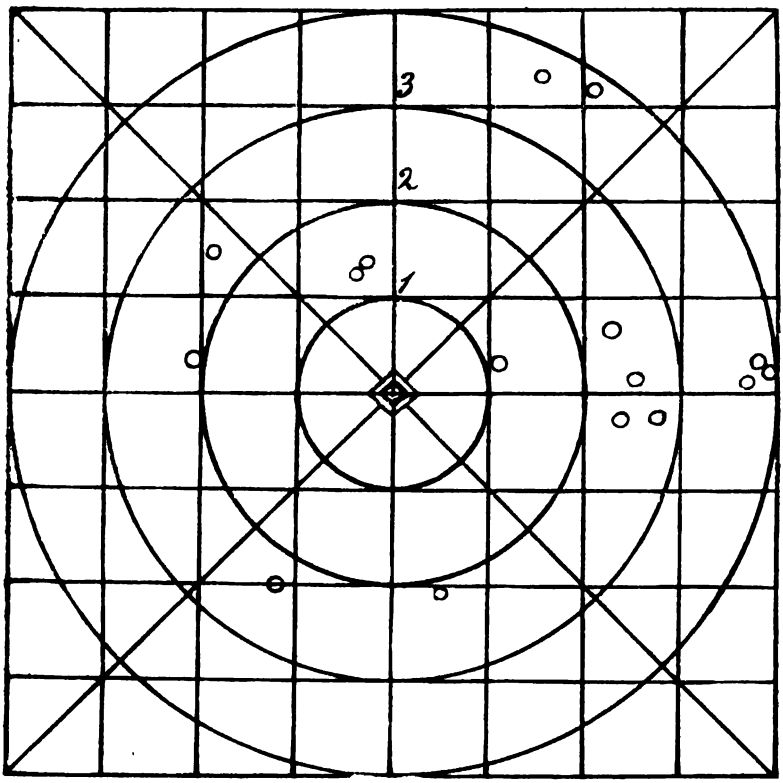

FIG. 1.

NORTH.

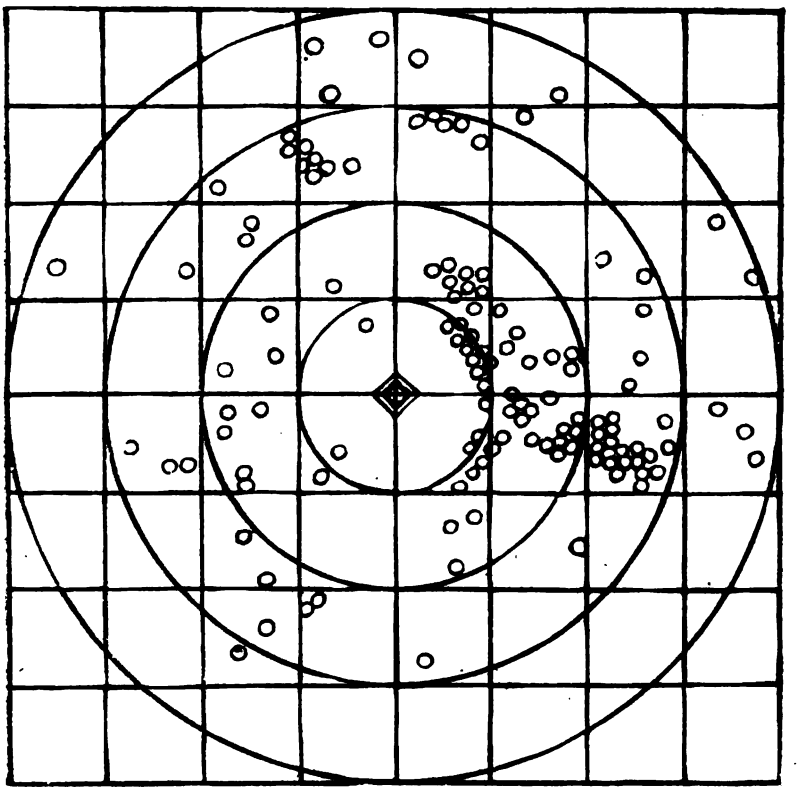

FIG. 2.

vious to this outbreak? A low barometer, severe frost, still, sometimes foggy weather, with occasional light airs from all points of the compass.

In the days, then, of the chief distribution of small-pox around Fulham Hospital, there existed over the neighborhood of the hospital opportunities of a remarkable kind, not for removal of matters contained in the air, but for the quiet dissemination of matters contained in the air, and for the deposit, perhaps, of any that were particulate.

While the incidents of small-pox upon houses coincident with this distribution of aerally-contained matters was almost the same in all directions from the hospital as a centre, the intensity of the incidence (measured by the percentage of houses invaded) was proportioned to the nearness of the houses to the hospital. In these particular days, too, an increasing number of acute cases of small-pox, being received at the hospital, was charging the air of the hospital with an abundance of infection in an active state. Mr. Power here remarks that "*in view of the whole case I find it impossible to regard these circumstances excepting as standing to each other in the relation of effect to cause.*"

Another meteorological circumstance, perhaps, is deserving of notice. We know too little of the action of *ozone* upon infections to justify much of positive inference from its presence or absence.

But from the 8th of January, 1881, to the 17th, eight days, *ozone* was entirely absent, and from early in December, 1880, to the end of March, 1881, there was no similar period of its absence. Ozone was present, therefore, just before, was absent during, and it reappeared at the end of, the period in which sufferers by the outburst of small-pox became infected.

Finally Mr. Power states that, as a result of his inquiry, it would appear that, "During this epidemic period, and most probably during former similar periods, there has arisen in the atmosphere circumstances of the time, peculiar facility for the dissemination in an undamaged state of any matter that may have been given off from the hospital."

These "*atmospheric circumstances*" and the concentration of large numbers of acute cases of small-pox in a hospital are to be considered as the prime factors in such a dissemination of the disease as occurred at Fulham.

This branch of the subject may be appropriately closed by a literal transcription of a portion of the first paragraph of Mr. Power's report: "The circumstances of the Fulham Hospital probably have a broad resemblance to those of other London small-pox hospitals in respect to the subject of these allegations; and the lessons to be learned from the present inquiry will probably not be without their application *mutatis mutandis*, to small-pox hospitals in other parts of the country" (and we might add "of the world").

As to the protection of persons living near a small-pox hospital, it is obvious that there are three modes of effecting this most desirable result.

The first and most certain mode is to vaccinate every one in the vicinity, so that they may defy and laugh to scorn the contagion or infection of small-pox.

The second is to sufficiently increase the distance between small-pox hospitals and surrounding inhabited dwellings, the minimum distance, as taught by the lesson of Fulham Hospital, being one mile. This end, difficult of attainment anywhere, is impracticable in the vicinity of towns and cities; which are the only places likely to need small-pox hospitals of any size.

The third method is to pass all the air emanating from small-pox patients through a fire, where the particulate matter constituting the poison of small-pox, the so-called germ, is certainly rendered inert, if not destroyed, as the numerous experiments with the Ransom stove have shown that a dry temperature of 255° F. is sufficient to disinfect any woolen garment infected with small-pox.

There are various modes of effecting this: Dr. Billings, U. S. Army, in his "Letters to a Young Architect" (Sanitary Engineer, Vol. 7, No. 6), describes a hospital visited by him in St. Petersburgh, used for typhus fever, where all the foul air passes through a central heated shaft.

Dr. Billings again (Sanitary Engineer, Vol. 7, No. 10), describes a ward for small-pox patients, devised by Dr. Burdon Sanderson, which is circular in form, holds but thirty patients. The air being admitted upon the periphery, thence, after passing over the patients, is drawn up through a central heated shaft.

Dr. O. W. Wight, health officer of Detroit, Michigan, de-

scribes (First Annual Report of the Board of Health of Detroit, 1882) an ingenious structure, which has five octagonal wards, which he calls "*A Flame Ventilated Small-pox Hospital*," which acts on the same principle as the above mentioned hospitals, the foul air passing off from the top of the ward through an iron pipe heated by a flame of gas, or some other material, to be kept constantly burning. This has never been tried, but one may be allowed to doubt whether an ordinary gas flame, in a pipe of twelve inches diameter, would heat a column of air, passing at the rate of five feet per second, to a temperature of 300° F., below which in such a rapidly moving current the disinfection of the air would not, in all probability, be effected.

But with all due deference to these learned and ingenious gentlemen, we have in the hermetically closed wards, heated by a Galton fireplace, of the small-pox hospital described in a paper which the author of this had the honor of reading before this Society in January, 1882, an apparatus amply sufficient to accomplish the same purposes as the above described more costly and pretentious structures. No one can doubt but that the passage of the foul air over the flame and through the ten feet of iron pipe of the Galton fireplace would totally destroy any germ of small-pox, especially if our common Western bituminous coal, with its high percentage of sulphur, is used; for experiments in England have shown that by burning sulphur in a disinfecting stove (Nelson's) clothing may be disinfected in ten minutes, and at so low a temperature as 175° F.

CATTLE QUARANTINE.—Dr. A. W. Farrington, Superintendent of the new Cattle Quarantine Station at Garfield, N. J., has submitted his report to Collector Robertson for the month of November. It appears that 292 cattle were in quarantine on the 1st of November, 170 were received during the month, 160 were released during November, and on the 30th of that month 302 were in bond. The importations consisted of Swiss, Holsteins, Aberdeen-Anguses, Jerseys, Galloways and Dutch Frisians. No aggravated cases of disease were found.

MILK AS A VEHICLE OF INFECTION.

The power of milk to convey infection on a wide scale has again been demonstrated in connection with the extensive epidemic of enteric fever in St. Pancras. Dr. Taylor, of Penrith, has, we beleive, the credit of originally pointing out that infection had, in all probability, been communicated through the agency of milk, but it was Dr. Ballard who, in 1870, first demonstrated that enteric fever had, as a matter of fact, been distributed by means of milk; the outbreak in question having occurred in Islington, where Dr. Ballard at the time acted as medical officer of health. Since that date a considerable number of epidemics have been shown to owe their spread to the same agency; over seventy such instances are recorded in a tabular form in the *Proceedings* of the State Medicine Section of the International Medical Congress held in London in 1881, the diseases in question being enteric fever, scarlet fever and diphtheria; and within the past two years fresh evidence has been adduced as to the influence of milk as a vehicle of infection. Notwithstanding the fact that the evidence on this point is now so complete, some observers still hesitate to accept it, and the more incredulous are to be found amongst French and German hygienists. The St. Pancras epidemic should, however, suffice as a final proof, for there has seldom been recorded so complete and so able a report on this question as that which Mr. Shirley Murphy, the medical officer of health for the district implicated, has recently submitted to his vestry. Towards the end of July last it was noticed that enteric fever was present to an abnormal extent within a certain defined area, and by the middle of September as many as 431 cases had come under notice. The disease was not due to any pollution of the local water service, which was distributed by two different companies; and no local sanitary circumstance could be identified as its cause. The fact that certain of the families infected in the early stages of the epidemic had, though living somewhat widely apart, received their milk from one milk-vendor, afforded some suspicion as to the origin of the outbreak, and it soon became obvious that, in some way or other, the operations carried out at a special

dairy were concerned in the distribution of the infection. The dairyman in question received milk from several farms in different parts of the country, and it was only as the result of a very exhaustive inquiry that Mr. Murphy was able, by a process of elimination, to identify one special farm at St. Albans with the production of the mischief. Inquiry at the farm then elicited the fact that a so-called case of pneumonia had occurred there on August 6th, the attack being accompanied by fever and diarrhœa, and that a boy who arrived at the farm on July 6th had sickened with enteric fever eight days after his arrival. And further, evidence was forthcoming to show that there existed facilities for the escape for the contents of a cesspool in the direction of the well which was resorted to in connection with the dairy operations. It was indeed finally demonstrated that the incidence of the enteric fever was specially upon the customers of one particular London milk-vendor, and that those who drank the milk in a raw state were more attacked than others; that the milk which was infective came from a special farm; that the infection it had received was operative for mischief before its arrival in London, as shown by an outbreak amongst persons who had consumed the milk both at St. Albans and along the line of railway to London; and lastly, that enteric fever had prevailed amongst the residents of the suspected farm under circumstances which favored the supposition that the infection could have reached the well-water in use.

The circumstances detailed in Mr. Shirley Murphy's instructive report renew the interest which for some years past has been taken in the matter of milk and its pollutions, and the occasion is an opportune one to notice some remarks on this subjcct which, a short time since, were addressed by Dr. John Dougall to the Philosophic Society of Glasgow. In consequence of the great divergence of opinion which existed some years ago in regard to milk poisoning, Dr. Dougall set himself to collate facts concerning it, and he made special examination as to the chemical constitution of milk with respect to its affording a favorable nidus for the reception and dissemination of zymotic poison; the result being that he arrived at the conclusion that sweet milk did constitute "a congenial soil for the preservation, and probably even the multiplication, of specific infections."

Dr. Dougall's present paper enters first into some details upon the composition and the peculiar changes to which milk is liable; he shows that it is a rich organic fluid—a solution in fact of the various chemical compounds by which the bodily structure is built up; he next details the process by which milk becomes acid, curdled, and putrid; and he points out that ordinary milk contains about 88 per cent. of its volume of water, a fluid which of all other natural bodies has probably the greatest solvent power. Enlarging upon this latter point, he adverts to the power of water in first absorbing and then condensing more gases than any other fluid, and especially such gases and vapors as are of an offensive nature; he calls to mind the fact that the offensive and unwholesome emanations from animal excretions—as from the urine, fæces, bowel gases, breath and skin —are largely absorbed by water, and he infers that, since water enters so largely into the constitution of milk, the latter fluid has also the same power. Putting this matter to the test, he enclosed in a jar a portion of certain substances giving off emanations, together with a uniform quantity of milk, for a period of eight hours. At the end of that time a sample of milk was drawn by means of a pipette from the lowest stratum of the vessel exposed in the jar; and quoting from Dr. Dougall's paper we find that the following were the results of his experiments:

1. Coal gas	Smell in milk	distinct.
2. Paraffin oil	"	strong.
3. Turpentine	"	very strong.
4. Onions	"	very strong.
5. Tobacco smoke	"	very strong.
6. Ammonia	"	moderate.
7. Musk	"	faint.
8. Asafœtida	"	distinct.
9. Stale urine	"	faint.
10. Creosote	"	strong.
11. Cheese (stale)	"	distinct.
12. Chloroform	"	moderate.
13. Putrid fish	"	very bad.
14. Camphor	"	moderate.
15. Decayed cabbage	"	distinct.

In several other instances the sense of smell was not alone

relied on. Thus (16) sulphuretted hydrogen, in addition to giving rise to a strong smell, indicated its presence by means of a black precipitate with sulphate of iron and ammonia; (17) ammonia gave a "moderate" smell to milk, and led to a black precipitate in the presence of sulphate of iron and sulphuretted hydrogen; (18) sulphide of ammonium gave rise to a strong smell in the sample, and was further indicated by means of a black precipitate with sulphate of iron; and (19) human fæcal matter gave a strong scent to the milk, and a black precipitate, indicating the presence of sulphuretted hydrogen, was produced on the addition of ammonia and sulphate of iron.

It thus became obvious that the milk had absorbed the emanations of all the substances to which it had been exposed, and it further transpired that all the specimens examined retained their distinctive odors for as long as fourteen hours after their removal from the glass jar in which they had been exposed.

Cream, according to Dr. Dougall, may be regarded as acting in much the same manner as milk; indeed, although it contains less water than milk, yet it has special qualities of its own which may perhaps make it even more liable to retain offensive and dangerous emanations than the parent fluid itself. Abundant evidence has, however, been given to show that far more care is needed in connection with the storage of milk than has heretofore been regarded as necessary, and this especially where milk or cream is kept in apartments or wards occupied by sick persons. If the emanations to which the milk is exposed are of a diseased and dangerous quality, it is all but impossible that the sample can remain free from offensive and dangerous properties, and it should become an invariable rule to keep as little milk as possible in sick rooms, and never to allow a supply which has been thus exposed to unwholesome emanations to be used for any other than ward purposes.

The experiments detailed only afford proof of the pollution of the exposed samples of milk; they do not show that the pollution was dangerous to health; and it is obviously impossible to procure, by means of a scientific experiment, actual proof of the results which would follow on the exposure of milk to the emanations of persons suffering from the several specific infectious fevers. There is, however, abundant evidence to show

that milk is capable of receiving the specific contagion of diseases such as small-pox, scarlet fever, enteric fever, and diphtheria, and of conveying them to others; indeed, it is assumed by some that it affords a medium specially favorable to the growth and reproduction of the particular poisons to which these diseases are due. Under these circumstances it has been lately held desirable to boil all milk which is open to suspicion before using it. In the course of several epidemics in which milk has acted as the vehicle of infection, it has been noticed that persons who had only consumed it after it had been boiled escaped all ill results, whereas other members of the same family or community who had not taken that precaution had been attacked with disease. Dr. Dougall is strongly of opinion that none of the organisms to which the infectious fevers are alleged to be due can possibly withstand the temperature of boiling milk—a temperature which, as he points out, would utterly destroy every form of tangible ovum and every kind of visible seed known. Mr. Murphy would evidently go further in his precautions. In view of recent experience he advises that all milk, without reference to suspicion of infection, should be boiled before it is used as a beverage for the human subject. By nature milk was intended to pass direct from the milk gland of the mother into the stomach of her young, whereas the injurious properties it acquires, whether these be the result of mere putrefaction or of the absorption of some specific infection, are all brought about by one or more of the many processes to which this fluid is now subjected in its passage from the cow to the consumer. Hence special precautions become necessary in its use.—*The Practitioner.*

PREVENTIVE MEDICINE IN CHINA.—It is recorded that on a certain occasion the Emperor of China inquired of Sir George Staunton about the manner in which physicians were paid in England. When he was made to understand what the custom was, he exclaimed—"Can any man in England afford to be ill? Now I have four physicians and pay all of them a weekly salary; but the moment I am sick that salary is stopped, and until I am well again; therefore, my indisposition is never of long duration."

ARTESIAN WELLS:—CHARLESTON'S WATER SUPPLY.*

When, in 1678, the first settlers of South Carolina judged it wise to abandon the site originally selected on the west bank of the Ashley, chosen ten years before, and instead to build the new settlement of Charlestown on the peninsula between the two rivers, there was no apprehension in their minds of any possible lack of excellent water. The peninsula was composed of a bed of quartzose sand, eighteen or twenty feet thick, lying on a lower bed of blue-black clay, very thick, and impervious to water. Hence the lower portion of the sand was ever and everywhere saturated with the water which it received from a rainfall averaging 43.78 inches each year. They needed only to sink a well twelve or fifteen feet deep into the sand anywhere, to have at hand an unfailing supply of water of the very best quality.

But as habitations were gradually built up and the population increased, it was noticed that the water in the wells, especially in the more populous portions, was rapidly losing its pristine purity, and was becoming hard, impotable, and injurious to health. The evil went on increasing and spreading with the growth of the city.

About 1820 a Mr. Longstreet determined to sink a well on his premises far deeper than the ordinary wells, hoping thereby to obtain water of a better quality. He sank a circular well twenty feet deep, down to the stiff clay, when, finding it too costly to keep back the water coming in from the sands around, he altered his plan; and in the middle of the well already made he sank an iron pipe through the clay to the further depth of thirty-seven feet, thus making its entire depth fifty-seven feet. The result was that water came up freely through this pipe, filling the well above and rising in it to within six feet of the surface. This water was "similar to, but purer than ordinary well water," even in that day, when many wells still yielded what was deemed fair potable water.

* Abstract of Report of Special Committee: Rev. P. N. Lynch, D.D., Prof. C. U. Shepard, Jr., and J. F. M. Geddings, M.D. From "Year Book," City of Charleston, 1881.

This Longstreet well seems to be the one still existing in a lot on the north side of Queen Street, between King and Archdale. Forty years after Mr. Longstreet's costly work—he spent $1,000 at it—the owner of that lot used to boast of his unfailing well, which, while neighboring wells went almost dry under a prolonged drought, continued to receive a copious supply of excellent water from a wonderful spring that bubbled up in its centre.

This may be regarded as the first of the so-called "sixty feet wells" sunk down through the stiff blue clay to a bed of water-bearing sand, which lies between that and the marl beneath. A dozen such wells were bored at a comparatively small cost in various parts of the city, some thirty years ago, and are still in use. But in his day Mr. Longstreet's experiment seemed too costly for private enterprise. Indeed, the important general law indicated by it, that at a depth of less than sixty feet water better than that of the wells might be obtained, seems not to have been appreciated, or even suspected.

Perhaps this was because just then public attention was strongly drawn in another direction. Accounts had come from London of an Artesian well, lately bored there, some 400 feet deep, and yielding an ample supply of good water. Descriptions of the tools used, and of the whole mode of procedure—all illustrated by drawings—were sent home from London by some Charlestonian then visiting that city, and were placed on public exhibition. They attracted general attention. An interest was aroused in the matter. The City Council was appealed to, and responded. In 1823 it was determined to undertake a similar well here by public authority, for the public benefit, and a committee was appointed by the Council, with full authority to act. In consequence, the work was soon commenced in the (then) poor-house yard, in Mazyck Street, under the superintendence of Dr. Philip Mosher and Mr. John Strohecker.

The enterprise was not a success. The iron rods, the tools, and the mode of procedure, so successful in the clays underlying London, were not suited to the sands and varying strata found below the surface in Charleston. The engineers also probably lacked experience, and certainly were not provided

with many important tools, invented or improved since their day.

Another and a more successful effort, though on a smaller scale, was made soon after by a private citizen. Dr. Joseph Johnson, desirous of obtaining water for certain tenements of his, in Washington Street, between Boundary (now Calhoun) and Inspection Streets, undertook an Artesian well on that site. Passing through the alluvial pluff mud, which, there, on the banks of the river, replaces the sands and the stiff clay found farther away from the river, he entered the marl at about the usual depth. At 109 feet he fortunately encountered one of those streamlets that find their way, in tortuous meandering channels, through the mass of limestone marl. The water rose in the pipe and flowed over at the surface, which at that place is very little above the level of ordinary high tide. It still continues to flow, and to give an undiminished stream of water.

Several years then passed without any renewed attempt on the part of the city or of any citizen, so far as we can learn, to undertake afresh the boring of an Artesian well.

But ere long several things occurred to arouse attention again and to excite a fresh interest in the matter. An Artesian well at Grenelle, in Paris, long worked at, had finally reached a depth of nearly 1,800 feet, and was said to pour out a stream of nearly 900,000 gallons of water every twenty-four hours. This result had been reached only after eight years of labor, attended by such repeated mishaps and seeming failures as had discouraged almost all connected with the work, and had made the work itself a subject of unceasing scoffings and of ridicule in the newspapers of Paris and among the wits of the day and their followers. Accounts came, also, of additional wells successfully bored in London. To these facts another perhaps weightier one was superadded.

The then infant science of geology was making rapid strides everywhere, and some knowledge of its general principles had entered into the current literature of the day. Men understood that the earth, for a considerable depth, in some places for miles below the surface, is made up of alternating strata—some impervious to water, some freely permeated by it—that those strata do not lie level, but are generally tilted up at one

border, and gradually sink down, perhaps, to a very great depth in the opposite direction ; that where the upraised edge or border of a permeable stratum reaches the surface of the earth, or, as the geologists say, *crops out* and forms a portion of the surface of the earth, it must obviously receive water from the rains that fall, and from the streams that flow over that tract of country ; and, finally, that the water so taken in continuously must find its way, by gravitation, along and down that pervious stratum to its distant and deeper portions, and this the more surely if above and below that stratum or bed lie other strata impervious to the water, and preventing its escape upwards or downwards. It was understood that an Artesian well is an artificial passage or opening in the earth, commencing in some place where the surface is considerably lower than the district where the stratum *crops out* and receives its supply of water ; and piercing vertically downwards, stratum after stratum, until it reaches the water-bearing bed sought for. From this the water contained in it, obeying the laws of hydrostatic pressure, will rise upward through the artificial passage of the well, and be discharged at its mouth in a quantity depending, 1st, on the amount of water supplied, that is, on the extent and the greater or less permeability of the water-bearing stratum itself, and on the amount of water it receives at its outcrop ; 2d, on the difference of level between the outcrop and the stratum, and the surface at the mouth of the well ; 3d, on the existence or non-existence of other known or unknown outlets, which may compete with the well itself in the delivery of water ; and 4th, on the length and the diameter of the well, and the resulting frictional resistance to the passage of a column of water from the stratum through the well, upwards to the surface of the earth.

It was further known that on our Southern Atlantic coast, all the strata, both permeable and impermeable, rise as they go towards the mountains ; sink deeper and deeper as they approach the ocean. To this general knowledge was superadded the discovery established by the geologists, and especially by Mr. Tuomey, our State geologist, that the position of Charleston corresponds to that of Paris and that of London. Like each of them, it stands on a tertiary formation which occupies a hollow or basin in the subjacent cretaceous formation. Con-

sequently, in all three alike, looked at from a geological standpoint, and in the light then thrown on the true theory of Artesian wells, such wells, if sunk sufficiently deep, should be equally certain of success. In Paris 1,800 feet was the necessary depth; in London from 400 to 750 seemed sufficient. Mr. Tuomey thought that our Charleston Basin might be found superior to either in this—that while in them it was necessary to pass out of the tertiary beds, more or less deeply into the cretaceous beds below, in order to obtain water, here, on the contrary, water might be hoped for in the lowest eocene bed, outcropping at Aiken, and termed by him the *Buhr-Stone* formation, and to be reached under Charleston, somewhere, he thought, at a depth between 400 and 600 feet below the surface.

To all this had to be added the significant fact that in the West, especially in Alabama, quietly and without any *eclat* in the engineering world, scores of Artesian wells from 350 to 900 feet in depth, had, of late years, been successfully bored by the use of tools and machinery that looked ridiculously rude and simple compared with the manifold and complicated tools and machinery of European engineers.

What remained but to recommence work? Could we not do here in Charleston what so many others had done elsewhere? It was all a matter of overcoming mere mechanical difficulties. The water was surely there waiting for us to reach for it.

Fort Sumter, in Charleston Harbor, was then in course of construction, and the engineer in charge, Major Bowman, undertook, in 1844, to bore an Artesian well within the fort, in order to secure for future garrisons an ample supply of water under all circumstances. He used cast iron pipes banded together, iron rods an inch and a half square, boring augers, chisels, cylindrical buckets with valved bottoms, and other tools after the standard European fashion.

In 1845 the City Council again commenced an Artesian well at the corner of Meeting and Wentworth Streets, under the charge of Gen. A. H. Brisbane as engineer. He followed the same plan as Mayor Bowman. The two wells were prosecuted at the same time and pretty much in the same style. The strata encountered in each corresponded closely, and showed that for the distance of four miles, which separated the two wells, the strata sank only a few feet each mile.

At the depth of 347 feet the iron rods in the Fort Sumter well twisted off, and the work was given up. A few months later a similar accident befell the city well at about 290 feet depth, and that work also was suspended.

In 1846 the City Council resolved to resume the work, under the charge of Mr. A. C. Melton, who had had a large experience in boring wells in Alabama. He brought to his task many admirable personal qualities, among them a wonderful sagacity in at once comprehending the true nature of difficulties encountered, even if unexpected and unforeseen, a ready ingenuity in devising means to overcome them, and a patient perseverance, which not even failure after failure could weary.

He used rods, not of iron, but of wood, armed at each end with iron screws, so that they could be connected firmly together. His auger and tools were of new and ingenious patterns, mostly his own inventions. Leaving untouched the old well, with the iron auger and iron rods at the bottom, he preferred to commence afresh a few feet off. At this new well he labored patiently and doggedly, as weeks ran into months and months ran into years, contending with water, with running sands, with hard rocks and with broken tools, and surmounting difficulty after difficulty, until at length he reached the depth of 1,260 feet. Here water was found, that rose in the pipes to a level of 24 feet 10 inches above the surface of the earth. But at the surface the well delivered only the comparatively meagre quantity of 30 gallons a minute. This was a disappoinment. It was too small a reward for so many years of hard labor, and for over $30,000 expended. Yet a further study showed that this was the exact quantity which, according to the laws of Hydrodynamics, should be delivered by a well, reduced as that had been to an internal diameter of three inches, and having a depth of 1,260 feet, and a head of only 24 feet 10 inches. The friction of the ascending column of water against the sides of the narrow pipe was sufficient cause for the smallness of the quantity delivered. Under the same head, and with the same length of pipe, a larger diameter would yield a far greater supply.

Fortified by this assurance the City Council authorized Mr. Welton to commence, on the same lot, another well which should, if possible, have a diameter of six inches at the depth

of 1,260 feet. He undertook the work, and, guided by his acquired knowledge of the strata before him, and of the difficulties to be overcome, and by his general experience in sinking the former well, he was able to work at the second one more expeditiously and more economically. In fact, when he had reached the depth of 1,230 feet, the cost of the work was about one-third of what the former well had cost for the same distance. Moreover, he still held an internal diameter of seven inches, which he was confident he could carry onward without reduction, to the end, thus more than meeting the expectations of the Council.

But unfortunately, at this point, a bucket and some portion of the rods were lost in the well. Such accidents had not unfrequently occurred before, and had been remedied. But ere he succeeded this time in extracting the bucket, other circumstances supervened which forced him, reluctantly, to suspend the work in 1862. Of course, nothing more could be done at it during the remainder of the war.

In 1867 the City Council again made an appropriation for extracting the obstructions and continuing the well. Mr. Welton undertook it again; but old age and infirmities were telling on him. After several failures he became discouraged and gave up the attempt. The well stands to-day as he left it.

It will thus be seen that when the City Council of 1876 made a contract with Mr. F. Spangler, a well-borer of large experience in the Northwestern States, to undertake a new well, to reach a depth of 2,000, perhaps 2,500 feet, it was not a first effort. More than fifty years before, such a work had been undertaken by the city authorities under Dr. Mosher, and in every decade, save one, of the intervening half century, a similar attempt had been commenced, or was earnestly carried on by the same authority.

Perseverance is a trait so seldom attributed to our people, that so signal an instance of it as this may well be noted.

To the work of this new well Mr. Spangler, like Mr. Welton, brought the aid of a long experience. His system of working differed from those of his predecessors. Dr. Mosher, so far as can be learned, Capt. Bowman and Gen. Brisbane, all used iron rods an inch or an inch and a half square, screwed together, end to end, thus forming a continuous iron bar, which reached

the bottom of the well, where an auger, already firmly screwed to the extremity of the lowest rod, was to do the required work. The weight of the rods being sufficiently relieved by a pulley from above, they were turned by hand, and the auger below gradually wore away a rock or more easily penetrated a softer stratum. When a certain amount of work had been done, producing so much detritus in the bottom of the well as to interfere with the action of the tool, the rods and the tool were extracted, and a cylindrical bucket with a valved bottom was let down to gather up and bring out the accumulated debris, so that the auger or other tool might be able to work freely again. Mr. Welton introduced wooden rods armed at the end with iron screws. They were less weighty and more manageable than rods of iron. His auger was exceedingly ingenious and worked wonderfully well in clays and stiff marls. In hard rocks it could not be used. In loose sand it was in no way superior to the auger used by preceding engineers. In fact, both were often useless. These sands, which are often converted by the water they contain into running quicksands, gave an infinity of trouble. They would run into the well, and in a single night fill up the tube for ten, twenty, fifty or even one hundred and fifty feet. The labor of extracting them by the bucket seemed almost endless. No sooner would the well be cleared, than a fresh irruption would take place, and all had to be done over again. Dr. Mosher, as we saw, spent six months in such work in order to gain six feet of additional depth. Mr. Welton's device for overcoming this difficulty was, for simplicity and complete success, a happy stroke of genius. He built a tank around the upper end of his tube and kept it supplied with sufficient water. This tank was movable, and could be so elevated that the level of the water in it would be higher than the head of the water found in the sand he was penetrating. The current of water, if any, must, under such circumstances, flow from the tank down through the tube into the bed of sand, not from the sand upward into the well. He was never troubled by irruptions of sand into the tube after that.

For strata of hard rock Mr. Welton used a chisel attached to an iron bar, both together weighing 300 pounds, and attached to the ordinary line of rods by a slip line, which saved

the many joints of the rods from the dangerous jar otherwise to be experienced at every blow of the chisel. With this chisel he would persistently pound away at the rock until he succeeded in drilling a hole through it into a softer stratum below. The diameter of this hole would, of course, be only the size of the chisel which cut it. The chisel must needs be small enough to pass freely through the interior of the tube. The hole would consequently be so small that the tube could neither sink nor be pushed through it. But, if advisable, the engineer was ready with other tools of special construction to enlarge the hole either from above downwards, or from the bottom upwards, as the case might require. By this means he was able to sink his tubes deeper and avoid a reduction of the diameter of the pipe. In this enlargement of the hole a singular fact often manifested itself. It not unfrequently happened that after working at enlarging it, the hole was left in the evening fully eight inches clear in diameter, that being the size required for passing his tube seven inches internal, seven and three-quarters external diameter. In the morning, on returning to work, the diameter of the hole would be found to be only seven and a half inches, and the work of enlargement had to be gone over again. In some instances this had to be done three times before the hole would stand at the diameter required for the tube to pass through. The difficulty arose from the fact that the stratum of rock, compressed by the weight above it and yielding in the direction of least resistance, protruded or swelled towards the hole on every side, thus reducing its diameter. It was only when this movement of the rocky mass had been accomplished, and the particles were again quiescent, that the tube could be safely pushed on. Before that the rock would have clasped the tube so tightly as to render it exceedingly difficult, if not impossible, to force it on.

Mr. Spangler dispensed with the use of the auger and with hand-boring entirely. For water-bearing or running sands, he, like Mr. Welton, kept a steady pressure on his tubes, and used his bucket. He resisted the irruption of sand by the column of water on his tube. His tank, however, was not a movable one, like Mr. Welton's, which might be placed at any desirable altitude. It was fixed in the earth around the mouth of his pipe, and the water in it was kept at the level of the surface of

the earth. Theoretically it was not so perfect as Mr. Welton's, but it was far simpler, and in point of fact it was found to work with sufficient efficacy to keep back any serious difficulty from running sands. For marls, clays and hard rocks, he relied on his heavy chisel, weighing, with its iron rod, fully 1,000 pounds. To this even the hard rocks yielded, and his progress was rapid. He, like Mr. Welton, encountered the difficulty necessarily arising from the alternation of so many hard and soft strata. The chisel must, of course, be smaller than the tube it passes down through, and the hole it drills through a hard rock below must necessarily be too small to allow the passage of the tube through it. Unless this be enlarged a new tube of smaller size must be introduced, and the diameter of the well thereby diminished. True, Mr. Spangler claims that by the use of a special chisel—the undercutter—he can enlarge such an opening through a rock sufficiently to allow a free passage to the tube above. But in point of fact he has been forced, in the present well, to reduce the diameter so often, on account of the frequent occurrence of hard rocks of considerable thickness, that, although he commenced at the surface with a tube of seven inches diameter, the lower portion of the well, for one hundred and fifty feet, has a tube only 2½ inches in diameter.

He has since undertaken a new well in George Street, for the Water-works Company, to have a diameter of six inches at the depth of 2,000 feet. With his present knowledge of the character of the strata to be met, and of the obstacles to be overcome or provided against, we have every confidence that he will succeed. He has commenced this well with a tube twelve inches internal diameter, which will allow a gradual diminution of diameter, when necessary, without making the last one too small to deliver the desired quantity of water.

Apart from the unavoidable diminution of the tube in its lowest sections, the well on Calhoun Street is an eminent success. A bed, or rather a group of beds of water-bearing sand, has been formed a little below the depth of 1,900 feet, and has been penetrated for a depth of over seventy feet without any indication of being exhausted; for, although the sands had become somewhat coarser grained, as if near the bottom, still the

fossils, found below 1,900 feet, give no intimation that the well is approaching the lowest and earlier portion of the cretaceous formation. We may well suppose that other water-bearing beds of the same formation would therefore be found below those already reached. Nor indeed is there any reason why water-bearing beds of sand should be restricted to the cretaceous system, or should not be found in other underlying stratified systems, the materials of which must, like the cretaceous strata, be derived in greater part from the detritus of the granite and metamorphic rocks of the Alleghany Mountain ridge.

The water now obtained in this well has a head of about 103 feet. It is delivered at the surface at the rate of about 250 gallons per minute, or 360,000 gallons in twenty-four hours. This is the quantity which, under that head, and with the varying diameters of the well, that well can deliver, according to the laws of hydrodynamics. Moreover, the sands themselves are so abundant, and seem so fully charged with water, that if reached by one or more wells of proper diameter, ten times the quantity now delivered might be confidently looked for.

If it be asked, whence does this water come, the answer must be sought in the geological characteristics of our State. A line starting from Augusta, Ga., and proceeding northeastwardly through Graniteville, Lexington, Columbia, Camden and Chesterfield County, will show a granite ridge rising from the depths below to the surface of the earth, exposed to view in favorable positions, elsewhere covered with superficial drift sands and clays. The line may, indeed, be followed northward through North Carolina, Virginia and Maryland. West of Augusta the line quickly sinks beneath superincumbent strata, and is lost to view. At its nearest portion this ridge is about 110 miles from Charleston, and its average height is not less than four hundred feet above the sea level. It is not to be presumed that this mass of granite rock allows free passage to subterranean streams or bodies of water infiltrating the earth. On the contrary, it would serve as a barrier wall intercepting such waters, as in fact it has intercepted the Saluda and other rivers, and forced them to change their direction until some low gap gave a gateway to the passage of the stream.

On the broad surface of this granite ridge, and on its seaward slope, the sands drink in the rain-water that falls. The

streams from the up country that cross the ridge may also supply their quota. The water thus imbibed sinks down by the force of gravity, ever seeking the lowest attainable position. Now the tertiary beds of the Charleston Basin, the cretaceous beds under them, and any other sedimentary beds beneath the cretaceous, must rest against this eastward slope of the granite ridge, and their sandy layers must drink in the water filtrating through the sands. As all these beds have a gentle slope towards the coast, the water will follow them down in their course. The Coast Survey has shown that for some fifty miles from the shore off Charleston the bottom of the sea sinks gradually and slowly at about the same rate that the land has been descending. In fact, "the bottom of the sea slopes gradually on this section (off Charleston) for some fifty miles, reaching a depth of about twenty fathoms (120 feet); then more rapidly to about sixty-five miles, and the depth of one hundred fathoms (600 feet); and suddenly falling off (in eleven miles) to a depth greater than six hundred fathoms." The eocene and the cretaceous formations encountered by our well, and others still deeper, therefore, probably, continue their course under water for over seventy-five miles, when they are cut off by the deep submarine valley which forms the bed of the Gulf Stream. There is evidence that the water contained in them finds a discharge into the sea. To this cause we must attribute the springs of fresh water that have been observed to rise, bubbling up at times in notable quantity, through the salt water at points along the coast, fifteen or twenty miles from the shore. In fact, we may well suppose that as these beds receive water at their upper outcrop against the granite ridge, so they discharge it at their lower submarine outcrop along the side of the Gulf Stream valley. Our wells simply tap the stream in *transitu*. In this we have an advantage from the friction which the water must encounter in the long journey still before it, from Charleston through the many miles of sand, to the Gulf Stream outlet. The lower the stream we tap here, the longer that journey, and the greater the friction to be overcome. The result is that here in Charleston the deeper the well the higher is the head to which the water would rise in the pipe. To this discharge of water under the sea must also be traced back a phenomenon which has manifested itself

in all our wells—in those, a dozen or more, about 60 feet deep, sunk some thirty years ago, in the many wells from 400 to 600 feet deep, sunk lately in the neighborhood of Charleston, and in the two wells sunk by Mr. Welton, 1,260 and 1,230 feet deep. In all of these wells, the level or head of the water in the pipes was observed to oscillate at tidal intervals, to an extent varying from four to six inches. The explanation is simple. In issuing from its natural vent under the sea, the fresh water must lift the column of salt water above, the weight of which acts as an obstruction. When the tide at sea is high, this column is greater than it was at low tide, and is more obstructive. The consequence is a diminution of the escape of water by that channel, and a compensating increase of the discharge through other channels not so obstructed, and an increase in the head of water in our wells.

Were an Artesian well fortunate enough to penetrate a subterranean stream or lake of water compressed on every side, the water would at once ascend the tube freely and flow out, to the proper amount. Something like this was said to have occurred at the well of Grenelle. The tools one day, in the midst of the work, broke through the bottom of a hard rock they were excavating, and dropped nearly three feet. The water came rushing up, and the tools could scarcely be extracted quickly enough.

Here the case is quite different. The well enters a mass of water-bearing sand, and it is necessary to act with prudence, in order to secure a sufficiently free flow of water, and to bring the well to a proper permanent regimen. In the beginning it is necessary to extract a certain amount of the sand by the tools, or to let it flow out naturally with the ascending current of water. This must go on until there is formed about the lower extremity of the tube a cavity in the sand—a subterranean lakelet, in fact—supplying the tube, and itself supplied by the water oozing into it from the sandy sides and bottom. The cavity will attain its proper size when, on the one hand, the well receives from the lakelet all the water which its diameter and length and the head of water will allow it to take; and, on the other, the supplying area of the sides and the bottom is large enough to send into the lakelet the same amount, with giving to the water, as it oozes out, a velocity which shall set the sands in motion.

This was the course pursued in the present well. The diary of the work records from 1880 to 1900 feet as occupied by a bed 20 feet thick of compact blue shale or marly clay. How compact we may understand, if we reflect that the superincumbent strata are all pressing down on it with a power of about a ton to the square inch. There was no water in it. Below the diary marks from 1900 to 1970 feet alternating strata of water-bearing sands from eight to ten feet in thickness, and of compact layers of clayey shales from two to five feet in thickness. When the well tube, after passing through the 20 feet bed, was found to be in a water-bearing bed of sand several feet thick, and giving otherwise favorable indications of a full supply, the tube was not allowed to be pushed on as rapidly as possible, in order to shut out those sands at once, and to reach the contract depth of 2,000 feet as quickly and as cheaply as possible. The pecuniary interests of the contractor might call for that. But your committee thought that the interests of the city demanded a different course. The tube was therefore arrested at this point. The extraction of sand commenced; at first, very slowly and laboriously by tools. In progress of time the stream of water ascending the tube increased until it began to bring up sand with it freely. As the desired cavity was thus being formed, the tube was cautiously lowered so that its mouth should always be very near the bottom—that position being found the best for the ready outflow of the sand, or for its extraction by tools. In due course the first of the alternating indurated strata was reached. The chisel quickly crushed its way through, and another sand bed was reached. There was an evident increase of water, and soon a second cavity was formed, separated from the upper one by the indurated stratum. The same process was continued down to 1,940 feet, where the tube was finally arrested. The tools, however, broke through other hard strata, and stirred up the sand for thirty feet more, reaching a hard stratum at 1,970 feet, of unknown thickness, for it was not pierced entirely through. In this work hundreds and hundreds of tons of sand were taken out from the well, to the no small benefit of those having low places to be filled up. As the work went on, it became evident that some of the hard strata dividing the sands, deprived of their support by the formation of cavities below, and yielding,

perhaps softening, under the action of running water, fell in fragments to the bottom of the cavity. These fragments rose in heaps, sometimes up to and around the mouth of the pipe, interfering with, and in some instances totally arresting the flow of water. The chisel would then be brought into requisition to break those fragments into smaller pieces, and the bucket would then remove them, so that the free flow of the water might be re-established.

How large the entire cavity ultimately became, or what is its shape, can only be matter of conjecture. Probably in height it reaches up to the twenty feet compact bed; and in some places it may have a diameter of fifty feet.

When the sand had completely ceased to flow and the water ran clear, it was evident the cavity was large enough, and had taken a permanent shape. The well had attained its proper regimen, and was turned over to the city authorities as complete.

The water has a temperature of 99.5° Fahr. The delivery, tested at four feet above the surface of the earth, that is, about sixteen feet above mean low tide level, as established by the Coast Survey, was found to be, as already stated, about 250 U. S. gallons per minute.

By analyses made in August, 1879, by S. T. Robinson, Jr., assistant in the Laboratory for Analytical Chemistry of Professor Charles U. Shepard, Jr., from one United States standard gallon, of 231 cubic inches in volume, and weighing 58.438 grains, there remains, on evaporation, residue grains 65.053727, consisting of the following ingredients:

Organic Matter and Water of Crystallization	1.733689
Carbonate of Iron	.335028
Sulphate of Lime	.442367
Sulphate of Magnesia	.165247
Chloride of Magnesium	.230291
Chloride of Sodium	11.390304
Carbonate of Soda	47.258488
Nitrate of Soda	.554260
Silicate of Soda	2.524745
Silica	361700
Total	64.996119

The water of the Artesian well, 1,260 feet deep, in Wentworth Street, gave, on a coresponding analysis, a total residue of grains 134.71458, of which one constituent, chloride of sodium (table salt) amounted to grains 63.38429; so that the water of the present well is superior to that of the Wentworth Street well, in the reduction of the total residue to less than one-half, and of the most objectionable ingredient, chloride of sodium, to less than one-fifth.

As a drink it is healthful. There is no deleterious ingredient in it. The habitual use of the water of the Wentworth Street well was known to be very beneficial in dyspepsia and kindred diseases. Although we have as yet no positive instances to establish the fact, it is probable, from the general similarity of the waters, that this water from the new well in Calhoun Street must exercise the same influence.

For culinary purposes it must be equally healthful. Some have objected to it because of the light golden tinge which it imparts to rice, hominy, and other farinceous articles of food when cooked in it, and which to their eyes appears an evidence that some injurious element must be present in the water. This, however, is an error. The tinge is due to the action of the soda in the water on the starch in those articles. Both the soda and the starch are excellent in themselves, and are in daily use. Their union is innoxious. The color resulting is a matter of fancy. Were it the fashion it might be admired.

For bathing no water can be more delightful. For washing and cleansing clothes it is far superior to the ordinary well water, and even to cistern water. But if articles are to be starched and ironed care should be taken to dry them thoroughly before doing so; or if the work is hurried, and the drying may not be thorough, then, after the washing, the articles should be rinsed in cistern water. If the sprinkling be done with cistern water, and the starch be prepared, not with Artesian, but with cistern water, there will be no room for the action of the soda on the starch, and the articles will show the desired lustre of pure white.

It has been asked: How long will this last? What natural agencies can interfere with it, or can cause its flow to cease? Obviously there need be no apprehension that the rainfalls on the tract of country that supply it will cease; or that the

beds of sand that conduct the water to it will cease to be permeable. Experience has shown that the iron tubes of the well will not rust. We need not consider the results of indiscreetly tampering with the well, or maliciously injuring it. The only danger we need consider is one arising from the unstable character of the sand in which the cavity which we have spoken of has been formed. The same trouble may in time occur here which it is said has been experienced in some other wells of the same character. The irruption of new streams of water into the cavity, or the wearing action of the water in motion, in time may disturb the sides or bring down portions of the roof, in fragments, to the bottom, thus repeating what so often happened during the formation of the cavity. These fragments may gather around the lower mouth of the pipe, partially or wholly choking it. In such case, unless the well clears itself, which it is inclined to do, it may be necessary to clear it out again with the use of tools, as it was done in constructing it. But the very largeness of the cavity itself tends to remove the danger to a distant future. And we may also feel assured that a tube of large diameter will be less liable to such accidents than a smaller one, for it will be better able to clear itself.

In congratulating the city on the final accomplishment of this long continued enterprise, we cannot forget that the work has encountered and overcome difficulties far greater than those met in boring Artesian wells in any other portion of this country or in Europe.

Nowhere else does the engineer meet so large a number of divers strata, varying from quicksands ready to run in and occupy the bottom of his bore, on to tenacious clays and stiff marls, and to hard limestones and conglomerate masses of rocks and shells. These all occur here in rapid alternations, taxing to the utmost the skill and the patience of the engineer. To succeed in such a task, is indeed a feat worthy of praise.

By a letter from Dr. Henry D. Frazer, Secretary of S. C. State Board of Health, to whom we are under obligations for this report, under date of December 11, 1883, we are informed that although the well on George Street is already 1,800 feet deep, and yields a good supply of water, it is now proposed to

make it considerably deeper than the one on Calhoun Street (1,970 feet deep), when it is expected the yield will be much larger—the tubing being much greater in diameter than the Calhoun Street well. "We are already experiencing," he remarks, "the great benefit derived from our supply of Artesian water, and just now this section is undergoing a most unusually protracted drought, and were it not for these wells, the suffering in the city would be very great. Their value in a sanitary point of view cannot be over-estimated."

IN THE PARK.

"We mustn't go near the pond, sissy,
'Cos there's something—I don't know what—there.
But I heard mamma talking about it:
It isn't exactly a bear—
But a *stagnant*, I think mamma called it;
And she says she's afraid every day
To live by the Park any longer,
And she wishes they'd take it away.

I never have seen a *real* stagnant,
But I guess it has teeth and would bite;
But don't be afraid, little sissy,
Because, if it comes, I will fight.
I'd be glad to see just what it looks like,
But I don't want to get *very* near,
'Cos it might make a spring of a sudden!
—I guess we had better stop here,
And sit down on one of the benches.
Now, don't make a noise;—just keep mum!
And don't take your eyes off the water,
And we'll watch for the stagnant to come."

—BESSIE CHANDLER, *St. Nicholas for January.*

MALARIA OR BAD AIR.*

BY W. C. VAN BIBBER, M.D.

The subject of malaria is an extensive one. In this paper it will be divided into that malaria which is found in dwellings, showing its effects in domestic life, and into that malaria which spreads over wide districts of country, and shows its effects among the inhabitants of those districts. There are general principles and laws which govern the atmosphere everywhere, whether it is good or bad, and these, it will be seen, have something to do with the question of malaria; but an attempt will be made in this paper to arrive at some conclusions concerning the impurities of the air immediately within the jurisdiction of this State Board of Health.

The meaning conveyed by the word malaria amongst physicians, as well as with the public, has recently undergone some change. Whereas, formerly, the word was kept within the meaning of its derivatives, now it is not used to express a cause, but as a name of a disease, and that disease is the most prevalent, and may be said to be the most fashionable one of the day. At the same time it is used as a prefix or adjective, as malario-typhoid or typho-malarial, with the intention to qualify the supposed influence which it exerts on all other diseases, more or less, according to its own peculiar laws. Within my own recollection the word was once more restricted in its application. Less than twenty years ago it was never used in connection with a case of disease which originated, and was treated in the hilly portion of this State. How different is it now! At present there are cases of disease found in every locality throughout the State, in what should be well appointed towns, as well as in the country, which are termed malaria, or malarial fever, and for which no other adequate cause or classified name can be found. This is so generally the case that physicians have been charged by the public with having

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hobbies, and with using the word malaria as an expression to cover or conceal their ignorance of some unknown cause for those effects which they evidently see before them. This is a serious charge against physicians, and is one which should be explained. If there is any foundation for this charge, one of three things must be true. Either it must be admitted that formerly it was a mistake to restrict the meaning of the word, or that at present the habits of building and living are so changed as to render the extended meaning of it necessary; or else, the physicians must declare that there is an error now in attributing prevailing symptoms to this cause, and calling the disease "malaria." It may be a difficult thing to show which one of these propositions should be accepted, and this difficulty is to be regretted. It would certainly be an interesting and profitable line of inquiry to pursue, to point out the changes which have been made in the personal habits of the people of this State, and to trace the effect of such changes in the resulting health. Changes have been made in the way of warming and ventilating houses, both in town and country Change in industries, as Dr. Forwood has told us, in the style of living, in the habits as to hours, and in many other ways, all of which might produce that peculiar cachexia which is now called by our physicians and people "malaria." This word has been mentioned as a substantive name of a disease in every paper read before this assembly. A resemblance may be traced in the disease thus named, and an attempted description of real malaria, which will be given further on in this paper; but whether they both depend upon malaria, or bad air, is the point to be determined. It cannot be expected to determine such a point in a paper like this, except by inference. The object here now is to point out where contaminated air may reasonably be expected, and to classify the causes of its contamination. The theories concerning the essence or active principle of malaria are too well known to be recited, and therefore its supposed chemistry or composition will not be discussed. With each one of the sources of malaria, as they are mentioned in this paper, so far as it is possible, some remedial means intended for general or popular use will be suggested.

The malaria found in houses, both in public buildings and in

private dwellings, large and small, called more properly contaminated house-air, and which shows its effects in domestic life, has many sources. In this city the most serious source is from the cesspools, but this will be mentioned separately. Excluding this, for both city and country, the want of ventilation may be regarded as the next most important. Building houses without fireplaces is becoming each year more common. Entire rows of "speculation" houses are built without fireplaces, and otherwise badly planned in regard to ventilation. A large majority of the public buildings, churches, court houses, halls and school houses in the city and country are said to be badly ventilated. A fireplace, with a thirteen inch flue in the clear, should be built upon each floor of every dwelling. The Academy of Music, the Natatorium, the Normal School, a few of the public schools in this city, and other buildings also, are completely ventilated, and prove that imperfect ventilation is not a necessity, but results entirely from carelessness. Wet, damp and unclean cellars produce in-door malaria, which permeates most dangerously the entire house. Building houses upon bad ground is another source of malaria within doors, and want of house cleanliness is another. These will all be remedied, one after another, as the bad effects from them are practically demonstrated to the inhabitants; but it is particularly necessary to mention them, in order to keep their importance before the people.

The malaria which is found, and has its origin outside of dwellings, may be divided into that which is peculiar to cities and large towns, and that which spreads over wider districts. The atmosphere of a city is more readily contaminated than the same area of country land, because the walls and yard enclosures prevent the air from moving through a city with the same freedom of natural currents which it does in the country; when air is partially stagnated it may be more easily contaminated. The air of a city is deteriorated by the radiation of heat from walls and pavements in summer, and is contaminated from the exhalations from gutters, butcheries and refuse manufacturing products at all times. The air of this city in particular is further contaminated by the exhalations from the earth itself, which holds gases of many kinds in its pores, and is constantly exhaling them into the air which we breathe;

particularly is this the case in summer, and more particularly when the earth is dug up in large areas in warm weather. Dr. McShane, of this city, has particularly studied this point, and will give some of his conclusions to the convention. The negligent fitting of gas pipes, permitting leaks, so saturates the earth in many places with burning gas, that some of the finest trees have been killed. All these are undoubtedly sources of malaria. Can they be remedied? Hard as the problem may seem, it would be by no means impossible, provided our citizens would lend a more determined hand in the matter.

To lessen the deteriorating quality of the air from heat radiation, I have elsewhere advised the more general planting of trees and the construction of gardens on the tops of back-buildings, stables, low warehouses, etc., for which kind of building the hills of this city offer peculiar facilities. The variety of trees make a difference, and there is a choice of selection from a considerable number of species. The maple and linden are the kinds most generally selected here, and they are beautiful. The worst city trees, in general use for the streets, are the ash and white mulberry. The most beautiful, in my judgment, are the alanthus, or trees of heaven, and the horse chestnut. The alanthus has been unfortunately discarded from the streets of our city for years, on account of a peculiar aroma from the male tree during two weeks in the month of July. There are certain individuals who say that this aroma gives them headaches. I think in most cases it is purely an imagination concerning the headaches; and it is well known that the female alanthus tree, which is more beautiful than the male, exhales no aroma. The female alanthus is the most beautiful tree suited to our climate that can adorn a city.

For the bad air, and the disease-conveying properties of city air, there is one and only one remedy; this is cleanliness. The leaders of government, and the instructors on health, must combine to patiently educate the public how to be clean, and to show them the necessity for it. If the earth in the city exhales bad gases, it is because noxious and putrescent matters are laid beneath it. Can the present state of this evil be remedied in the great city of this State? On account of its geographical situation and its topography, Baltimore should be an

exceptionally healthy city. It is in a temperate climate ; in a sheltered position ; has an abundant market, from land and sea; most of the luxuries of the table are abundant and cheap; a profusion of water, moderate prices for fuel, and every kind of sociable and agreeable recreation for its citizens. For its topography ; it is situated upon hills, from which a grade could have been originally established to deep water, by filling up the intervening hollows, which would have made its surface drainage better than it is now. Much could be done in this way yet by filling up the "submerged district" or "meadow," and draining over its surface to deep water. Yet, notwithstanding these advantages, compared with other cities, Baltimore is not an exceptionally healthy city. The published death rate is 18.3 per thousand, and the appearance of its inhabitants does not make it remarkable in respect to health. Why is this so?

I believe that besides the sources of malaria already mentioned, there are two other sources to be discussed, which are worse than all the rest combined. I mean the malaria emanating from the cesspools and the sewers. Of my own personal knowledge, I can testify that the Harford run and the Pearl Street sewers emit nauseous and even deadly miasms. But the cesspools are admitted by all persons to be the greatest nuisance which we have. It is an increasing nuisance, for, if bad now, what will it become in the course of time? There are now in Baltimore from fifty-four thousand to sixty thousand houses, and the same number of sinks upon an area of nine thousand six hundred acres. In some places the earth is thickly studded with them. These discharge their gases, at all levels, into the air. To remedy this, I have an idea, and the spirit moves me to proclaim it. The matter is of such paramount importance that it should not be evaded. I know full well the difficulty and the almost hopelessness of the subject. Although I believe you will listen to me with reluctance, and although my mind shrinks from the task, yet I will begin it from a standpoint which may merit both consideration and calculation. The difficulty of the entire subject is owing more to its unpleasant nature, and to a natural loathing from its consideration, than from any real difficulty of bulk or weight, when taken from inventive, engineering or industrial standpoints.

Physiology teaches that an average adult, weighing one hun-

dred and forty pounds, requires, in round numbers, about two and a half pounds of solid and three pints or pounds of liquid nourishment in twenty-four hours. From this he passes about two pounds of liquid and less than one-half a pound of solid excreta daily. Is it impossible to remove this, or at least a greater portion of the solid matter? Ask those who know the price of labor if it need be so exceedingly expensive as to condemn it from this item alone. But it requires custom and time to familiarize a population with the idea of a removal of this matter, and it requires the ingenuity of man to collect the material, and after these are overcome then the difficulty will no longer be great. The weight or bulk of the material to be moved is comparatively small. It is for this reason that I believe the best closet has not yet been invented, because, when it is perfected, it will have for its chief object the removal of at least the daily one-half pound per adult capita of solid excreta. Let any one make the calculation for all ages of inhabitants for a city the size of Baltimore. The end of the best calculation I can make for this entire removal brings the expense down to the one-third of a cent daily for each individual.

It would indeed be a wondrous boon to this city, and to the inhabitants of all the cities of the earth, if this one problem could be solved on the basis of complete removal of solid human excreta. When the small quantity to be removed is known and carefully considered, I trust the day is not distant when it will be accomplished. I have an unfailing confidence in the inventive ingenuity of the free-born American citizen. Does any man believe that the system now in use here is the best that can be devised? It is the truth to say that numberless of our citizens are afraid of their own homes. For one, I feel that when the subject is seriously undertaken with further knowledge and different calculations from those which have maintained heretofore, something more, something different, something better may be done. And to encourage us in this belief, after this paper was written, THE SANITARIAN of the 22d of November, *received to-day*, contains a paper upon "The Treatment and Utilization of Town Refuse," by John Collins, F. C. S., F. G. S. L., from which it appears that the town of Bolton, in Scotland, having one hundred and six thousand inhabitants, remove this kind of refuse. Mr. Collins says: "It does

not pay expenses, of course, but it costs less than any other plan in operation on a similar scale." He does not give the minutia of the manner of collecting the excreta, but makes these suggestive remarks: "The collection and scavenging are mainly effected at night, and by means of closed carts of excellent design. There are a few water closets, but the *newer* cottage property are provided with 'pails.' These are roughly assorted on loading," &c. This looks as if the elaborate arrangements now in use here would some day or other be substituted by pails or some sufficiently ingenious contrivance to remove and utilize the solid excreta. Where men are crowded together, as in cities, it is necessary to remove the solid excreta daily, and not to hide it forever. I believe it will be easy enough to make way with the liquid excreta, which is easily chemically neutralized.

The last source of malaria to be mentioned is that which affects the inhabitants of the low lands, or the cretaceous, the tertiary and the post tertiary lands, of this State. It is known to us as that malaria which pervades large districts of territory. Its essence is not known. From the earliest days of medicine it has been supposed to produce ague-and-fever. Elsewhere, in a report upon the drinking waters of Maryland, I have spoken of the investigations of others in seeking for the cause of ague-and-fever in the drinking waters of the flat lands. This is an interesting subject; but as it is yet undetermined concerning the water, it is fair at present to hold that if ague-and-fever is conveyed into the human system through the air, that this is the great and prevalent out-of-doors malaria of which this State Board of Health has charge. We have all seen type cases of long continued or chronic ague-and-fever which have originated in this State. Let us suppose one particular case of an adult, who has had the disease since childhood, and he will present upon examination these prominent appearances and symptoms. In figure he may be taller than the average height, gaunt, thin and bony; with a muddy, ugly complexion, without tint or color; awkward in motion, slow in speech and action; slow in cerebration, ignorant, superstitious, untidy; always thinking of himself and his diseases; will talk by the hour of his chills and fevers, when they come on and when they pass off; will take any quantity of quinine, blue-mass, calomel,

cholagogue or any advertised remedy; but is so fond of his home and neighbors in like affliction, that he will never leave it or them. A most prominent symptom of his malady is that he will take no advice, and refuses to appreciate anything like advancement. Should this adult die suddenly, or, as often happens, die from some intercurrent disease, as pneumonia, the skilled pathologist will pronounce his liver different from the physiological liver in color, consistence and size. His spleen will be found large, soft and pulpy, and his blood changed in color and in microscopic appearance.

This type case of old-fashioned malaria, with some sectional differences, has been found in all parts of the world, between certain parallels of latitude, wherever our navies have gone. It is common on both the east and west coasts of North and South America, and in the adjacent islands; on the coasts of Africa, Asia, and on the shores of the Mediterranean Sea, and also in the river bottoms and swamp-lands of these several continents. This is the wide-spread out-of-doors malaria, well-known in medical as well as general literature. For its habitat and gravity in our own State and country one can consult the map issued by the census bureau in 1870. If this is a fair description of the disease in question, however imperfectly it is drawn, and if this board of health has even indirect charge or self-imposed responsibility concerning those suffering with this affection, is it not an interesting theme to them? Is it not a pleasant duty to promulgate knowledge, and ways and means by which these terrible sufferers may be relieved, if it is possible? To relieve them would be even more than equal to the work of Jenner, or like the rite of Apotheosis amongst the ancients.

Whether this disease comes from a malaria over the land or from germs in the water, the best means that I know to prevent ague-and-fever (nothing need be said here of its cure), are these: Temperance in eating and drinking, and avoiding during summer entire suits of linen clothes as a summer wear; drying the air of a sleeping room by fire, night and morning; building dwelling houses above the earth, in order to give an air circulation between the earth and the house; avoiding the night air out of doors in certain places; filtering and boiling drinking water; cleanliness about houses and yards; drainage from the premises; high trimming of trees around houses on

sides facing healthy localities; and the removal of all stagnant waters from the neighborhood of dwellings. In a report made to this board of health in 1878, I suggested sprays of carbolic acid to be industriously applied during three months in the year in the houses where chills are known to prevail. All these means are easily enough carried out, and if they will prevent this terrible disease, are fully worth the trouble they will give.

I must be permitted to say here that it is not derogatory to the medical profession, as a body, that they cannot positively assert what is the peculiar principle or essence in the air, if it is in the air at all, by which fever-and-ague is conveyed into the human system. On the contrary, it is a credit to the profession, as a body, that, notwithstanding previous disappointments, many of its members are still diligently searching to find this unknown cause; and who will doubt that, in time, it will not be discovered?

In this paper I have endeavored to be practical in what suggestions were made. It was prepared with the hope that it might prove useful in calling the attention of some of our citizens to points which may not have occurrred to them amidst their own special labors and occupations. By this I thought to fulfill the wishes of the board, who invited me to prepare it. I have not entered into the theories, the philosophy, or the science of causes, of malaria. I have not attempted to describe the micro-organisms, which are supposed to produce it, because I had nothing to add, from my own researches, to what is already known on the subject, and in this case it is better to leave such discussions to the universities, where they properly belong.

LEVEL-HEADED BABY.

A little girl knelt down to pray
  One morn. The mother said,
"My love, why do we ever say,
  'Give us our daily bread'?
Why not ask for a week or more?"
  The baby bent her head
In thoughtful mood toward the floor,
  "We want it fresh," she said.

[*American Miller.*

YELLOW FEVER IN VERA CRUZ AND COLON IN 1882, AND THE LOUISIANA STATE BOARD OF HEALTH THEREON IN 1882 AND IN 1883.

By STANDFORD E. CHAILLÉ, M. D., Professor Physiology and Pathological Anatomy, Medical Department University of Louisiana.

On April 17, 1882, the usual annual Quarantine Proclamation was issued by the Governor of Louisiana, and, in compliance with the recommendation on June 8th of the State Board of Health, this proclamation was amended on June 12th. Among other amendments, it was "provided that the port of Vera Cruz, which is known to be at present perfectly healthy, shall be exempt from the effect of this proclamation until the further date of July 1st, 1882."

Notwithstanding the superlative strength of the words, "known" and "perfectly," sanitary authorities, other than the State Board, denied that this Board could have the *knowledge* which it proclaimed, and therefore strongly condemned the above proviso as very dangerous. In evidence of this, one report, written immediately after the publication of the above proclamation, maintained the following views: "The history of yellow fever at Vera Cruz justifies the belief that this port is not "*perfectly*" free from the disease, and that a thorough medical inspection of its hospitals, etc., would prove that it was not entirely free on June 8th or on June 12th, the dates when the State Board and the Governor's proclamation published to the world that "Vera Cruz is *known* to be at present *perfectly* healthy." However, it is well known that, as it respects Vera Cruz and all ports habitually infected with yellow fever, it has always been easy to procure certificates from captains of vessels, merchants, doctors, and even from local sanitary officers and United States Consuls, to the effect that their port was free from yellow fever, when, in truth, it was only *comparatively* free. Dr. Trowbridge, United States Consul at Vera Cruz, does not believe that yellow fever can be imported, and officers who thus believe cannot be expected to be as cautious, skeptical and thorough in inspection as if they did believe in the danger of infection."

Soon after this, another report on the same subject maintained that—"The records of yellow fever prove and experience in Cuba is convincing, that very great difficulty is encountered, even by a disinterested medical inspector, and even when on duty at the very port habitually infected, in determining—at times when yellow fever is not prevalent—that *no cases* exist. Ordinary evidence (from newspapers, merchants, captains, consuls, etc.,) does not, in such a case, enable one to "*know*" that an habitually infected port is free from *all* cases of yellow fever, and still less does such evidence enable one to "*know*" that such a port is free from the danger of exporting infection. In truth, there is much evidence tending to prove that, in habitually infected places such as is Vera Cruz, the poison is ever present; and that, though it may remain temporarily dormant and inappreciable, yet this dormant poison may be exported, and, should it elsewhere find the conditions requisite for its revivification and growth, it may give rise to a pestilence even at a distant place."

These quotations will suffice to show the opposing views entertained in 1882 by the State Board on the one hand and by other sanitary authorities on the other hand, and also to show the reasons why the latter distrusted the former in this matter. At last in 1883 conclusive evidence has been presented to prove whether this distrust was well founded or not. In the meanwhile, it should be remembered that the State Board, whose political convictions as to "State sovereignty" rendered the United States National Board of Health very offensive to it, has none the less entered into very close alliance with the United States Marine Hospital Service, and therefore that the evidence of the latter is the evidence of a friend.

The Annual Report for 1883 of this friend contains, on pp. 387–391, a valuable report from Assistant Surgeon John Guitéras. On duty at Vera Cruz in July, 1883, Dr. Guitéras reported that in 1882 fifty-eight cases of yellow fever were admitted to the Hospital de San Sebastian, which admits *males only*. Of course, many more cases must have occurred in the female population and in those numerous males who never become inmates of a hospital. Dr. Guitéras' report further shows that there were admitted into this hospital actually more yel-

low fever patients in 1882 than in three other of the eight years, 1875–1883; and he emphasizes the lesson often taught before, yet unheeded by the State Board in 1882, that "in Vera Cruz, as in Havana, yellow fever is an endemic disease; it prevails *every* year, and probably there are cases of the disease in *every month* of the year." Since this evidence renders only probable, but does not prove, that yellow fever was present at the time (June, 1882), when Vera Cruz was "known to be" "perfectly healthy," as alleged by the State Board, it is necessary to present additional evidence.

This has been recently and conclusively presented by Dr. Mainegra, of New Orleans, who was employed for special service at Vera Cruz by the United States Marine Hospital Service, on the recommendation, as I am assured, of the State Board. The proceedings of this Board, as published in the *Picayune* of Sept. 21st, embrace a letter from Dr. Mainegra, dated Vera Cruz, Aug. 31st, 1883, to the President of the State Board. In this letter is to be found the very same lesson taught by Dr. Guitéras and repeatedly by other authorities before as well as since the birth of these gentlemen. It is as follows: "No doubt you are informed of the fact that yellow fever prevails here the year round, and nothing is said about it at all. Last year [1882] seventy-two deaths occurred in this city and port, twelve of these in the month of December, the disease being considered very mild that year." When one recalls the *something* which, in June, 1882, the State Board "said about" yellow fever in Vera Cruz, Dr. Mainegra's opening phrase, "*no doubt you are informed of the fact*," presents an unintentional example of sarcasm as amusing as any book of rhetoric contains.

Having returned from his mission, additional evidence of importance was presented to the State Board by Dr. Mainegra. This, as published by the *Times-Democrat* of December 6th, and the *Picayune* of December 6th and 7th, reports the following pertinent facts: "The Vera Cruz authorities have heretofore been of the opinion that yellow fever is not contagious, and hence report that there is no yellow fever prevailing." Further, a valuable tabular statement of the yellow fever statistics of Vera Cruz for the years, 1881-2-3, shows, as to 1882, that there were 72 deaths by fellow fever, and 133 ad-

ditional deaths by diseases of which the names are frequently misused to conceal yellow fever; that there were deaths by yellow fever in every month of said year; and that there were more of such deaths in June, the very month when the State Board proclaimed to the world its *knowledge* that Vera Cruz was "*perfectly* healthy," than in any other month of the year, with only two insignificant exceptions. In June, 1882, there were *11 deaths* from avowed yellow fever, and *14 deaths* from diseases by which yellow fever is frequently misnamed, thus implying the presence in said month of not less than from 50 to *150 cases* of yellow fever.

On the presentation of these facts by a disinterested medical inspector to the State Board, the member—who had in June, 1882, moved the dangerous proviso, exempting Vera Cruz from quarantine because "known to be" perfectly healthy—was induced to declare to his erring Board, that "these revelations were startling and important in view of the clean bills of health and favorable statements with which the Board of Health had been *imposed on.*"

It has already been shown that, to sanitary authorities other than the State Board, these revelations must have been anything rather than "startling," and that these authorities had not for an instant permitted themselves to be "imposed on." And this fact is but one among many showing why other health authorities have not given to the State Board that confidence which this Board has so indignantly claimed was unquestionably due to it. Surely he, who declared that an opponent was being imposed on, and was thereby imposing on others, is amply justified in his lack of confidence, when his opponent is finally forced by proofs to avow that he was "imposed on."

It is earnestly to be hoped that no sanitary authority will again permit itself to be thus deceived, by evidence which is easily to be procured—as all who are familiar with the history of yellow fever have long known—from any habitually infected place, and which is so generally false that the health of no community should ever be jeopardized by such evidence.

COLON, ISTHMUS OF PANAMA.

In so many other instances, besides the one now stated, has the State Board been just as manifestly "imposed on," that it

ought not to be surprised that other sanitarians failed in 1882 to coincide with its President when he stated that "he was convinced that there was no yellow fever there [viz., at Colon], at the time the *Ile Marthe* was in that port,".p. 328, An. Rpt. 1882. This conviction was based on two consular letters, to which were subsequently added a newspaper extract and letters from one or two citizens. Assuredly there must have been evidence just as strong, and probably much stronger, to induce the State Board to proclaim to the world that Vera Cruz "was known to be at present perfectly healthy;" and, if "imposed on" by such evidence in the one case, then why not in the other?

However, whether the State Board was or was not "imposed on" as to Colon, was really immaterial to the issue raised against said Board. To comprehend this issue requires the following brief statement of the pertinent facts: Published information, dated Panama, May 11th, and again June 29th, warned New Orleans that Colon was infected by yellow fever.* On June 18th, the *Isle Marthe*, from this port, arrived in New Orleans, and by the 22d, its ballast had not only been discharged in a thickly settled part of New Orleans, but was also, until about August 16th, used to repair adjacent streets. In the meantime, the only four undisputed cases of yellow fever in New Orleans, in 1882, occurred, and all of them within a stone's throw of this ballast. With good reason, these cases had been attributed to another source of infection; but when, about the middle of August, the attention of sanitary officers was for the first time called to the ballast, I, among others, held that this ballast *might* have been the source of infection; that its discharge at a city wharf should never have been permitted; and that it ought to be disposed of at once. The State Board deemed itself aggrieved, and defended itself by declaring that Colon was not infected, and therefore that the ballast could not be.

Now, I answer again that, while it has never been proved that Colon was not infected, it is immaterial to the issue made

* The Annual Report of the Louisiana State Board of Health for 1882 attributes this information (p. 234) to Dr. Nelson, whose veracity is denied on the authority of U. S. Consul Jas. Thorington. It is worth noting, that Dr. Wolfred Nelson, of Panama, reports in the *Canada Med. Record* 31 cases of yellow fever to November 21st, 1883, of whom 22 died.

whether it was or was not. For the published information about Colon, its geographical position, its increased number of unacclimated immigrants, etc., were sufficient, in the absence, at that time, of any good evidence to the contrary, to cause Colon to be treated as a suspected port; in addition, and of much more consequence, the Board of Health itself was treating Colon as a suspected port, inasmuch as it was subjecting vessels from there, even the *Isle Marthe* itself, to detention at quarantine. Hence, the issue really made was as follows:

Any Board of Health, which decides that a port is sufficiently suspicious to quarantine the vessels therefrom, ought, beyond question, to decide that the ballast from such vessels is sufficiently suspicious to require a rigid prohibition of its discharge where any person may be exposed to risk of infection by it, and its discharge should be much more prohibited into such a centre of population as the ballast of the quarantined, and therefore suspected *Ile Marthe* was discharged into. This, the only issue ever made, has never been met by the State Board, which, however, has in this instance, as in many others, diverted attention from the true issue by inventing false ones. In part illustration of this fruitful subject, attention is called to two quotations from the Annual Report of 1882.

It is stated, p. 241, that: "Even if the ballast which was *accused* by the representations of the National Board of Health [Drs. Bemiss and Chaillé] and the Medical Director of the New Orleans Auxiliary Sanitary Association [Dr. W. H. Watkins], of engendering yellow fever in New Orleans in 1882," etc. Now, all three of these gentlemen published reports on the subject, yet no word was ever written, nor, as I am assured, was ever spoken by any one of them, very certainly not by myself, to justify this language. No one of us ever "*accused*" this ballast of engendering yellow fever; no one of us ever used language stronger than that *possibly or probably* this ballast *may or might* have engendered yellow fever. Such hypothetical words fail to amount to *an accusation*. What the Board *was* "accused" of was negligence in permitting the ballast from a vessel, which it had quarantined, to be discharged into the streets of New Orleans. Let it meet this accusation, which was and is still made, and not an accusation invented by itself to divert attention.

The second quotation, p. 231, is as follows:

"As the Supervising Inspector of the National Board of Health [Dr. Chaillé] held the position of one of the Vice-Presidents of the New Orleans Auxiliary Sanitary Association, and was present when this *wonderful discovery* of the *dangerous properties* of the ballast *was disclosed*, it was *his duty*, as an employé of the National Board, to have communicated this fact to the State Board of Health;" and, in proof that it was his duty to report, his official instructions are correctly quoted as follows: "In case it becomes proper to notify the health authorities of Louisiana of any danger to its public health, present or prospective, you [Dr. Chaillé] will do so, in accordance with your previous instructions."

As already stated, neither I nor anyone else ever had or pretended to have possession of any such "fact" as "this wonderful discovery of the dangerous properties of the ballast" disclosed. And language could not worse pervert the advocacy of the opinion, shared in by sanitarians generally, that suspected vessels contain suspected ballast, and that human life should not be exposed to any risks from such ballast. "Wonderful discovery," indeed! Language so misapplied, so perversive of truth, is enough to sicken the stomach of even a newspaper reporter! Nevertheless, let me get at the issue again invented to distract attention, namely, my failure of duty in neglecting to report the ballast to the State Board. It is true I did not report it to the State Board, yet it is also true that the President of this Board had no reason, comprehensible to me, for charging me with neglect of duty, except to divert attention once more from the neglect of duty of his own Board, as involved in the disposal of said ballast. For, while it may seem incredible, it is none the less the simple truth, that those who first reported this ballast to me did so *after* having given the same information to one or more representatives of the State Board, and when my informants first reported the facts to me they assured me positively that they had already or would at once make the same report to the State Board. What is to be thought of a charge of neglect of duty in failing to report information which the Board was in possession of before myself? My official instructions were to report certain facts "*in case it becomes proper*," and most as-

suredly I did not deem it proper to report superfluous information. Therefore, although not my duty, in this case, to report, it was my duty to use my influence in having the suspected ballast promptly disposed of, and I deemed this duty discharged when assured by those whom I trusted, and at the very time when the ballast was first reported to me, that it would be at once removed either by the State Board or by the Sanitary Association—the latter to act separately if it failed to secure conjoint action.

In order that the reader may better comprehend the merits of the question, whether neglect of duty was justly chargeable to me or to the State Board, I append the following evidence from the President (in 1882) of the Sanitary Council of the Mississippi Valley and from the Medical Director of the Sanitary Association:

NEW ORLEANS, December 8th, 1883.

DR. S. E. CHAILLE—DEAR SIR: Yours of the 8th inst. is at hand. On the same day I communicated to you my suspicion that the *Ile Marthe's* ballast was the source of yellow fever infection, I addressed a postal card on the same subject to Mr. Ed. Booth, a member of the Conference Committee of the State Board, and furthermore I called upon him. I explained to him my reasons for requesting that said undisinfected ballast should be attended to, and cited the precedent of the ballast of the *Valparaiso* with its sad results in 1873. Mr Booth promised me to call the attention of the President of the State Board to the same, and I have no doubt that he did so. Yours most truly,

GUSTAVUS DEVRON, M.D.

NEW ORLEANS, December 8th, 1883.

DR. S. E. CHAILLE—DEAR DOCTOR: In reply to your note of the 8th, I can state that one member of the Board of Health had information in regard to the presence of the ballast from the *Ile Marthe* and of its suspicious character, before either you, Dr. Bemiss or myself had any knowledge of it. The suspicious nature of this ballast was brought to light by Dr. Devron, who called to see Mr. Booth about it while the doctor was on his way to the rooms of the Sanitary Association. Soon after this, on the same day, the suspicious facts were reported to me and I at once commenced an investigation. This same day I vis-

ited you for consultation and found that Dr. Devron had called to see you. In returning from your office, I fell in with Dr. R. A. Bayley, sanitary inspector of the Board of Health, and gave him an account of the investigation. He was so much interested that he requested me to stop with him at Mr. Mark's office and to report to him the facts obtained. I went at once with Dr. Bayley to Mr. Mark's office and explained all I knew, concealing nothing from the representatives of the Board of Health. Considering that two of its most influential members, Mr. Booth and Mr. Marks and one of its sanitary inspectors, Dr. Bayley, had all data I could give, I did not trouble myself further. I am truly yours,

W. H. WATKINS, M.D.

Finally, I had additional evidence that the State Board was as promptly and fully informed as myself respecting the ballast of the *Ile Marthe.*

THE LIERNUR SYSTEM OF SEWERAGE.

A REFUTATION OF THE CRITICISMS OF COLONEL WARING AND DR. BILLINGS.

BALTIMORE, January 2d, 1884.

DR. A. N. BELL, *Editor of* THE SANITARIAN:

DEAR SIR: I have your esteemed favor of the 31st ult., in which you call my attention to the fact that, as far back as 1874, and again in 1879, THE SANITARIAN published favorable notices of the Liernur System of Sewerage. I was quite aware that the system had been noticed by several American journals, notably THE SANITARIAN, as well as in one of the Reports of the Massachusetts State Board of Health, and, I believe, *The North American Review.* I am also aware that Col. George E. Waring once wrote encouragingly of the system, and that it was examined by Mr. Rudolph Hering when he was in Europe, but with what result I am unable to say, as I have seen no publication from him on the subject. The statement made by me, therefore, in "A Refutation of the Criticisms of Col. Waring and Dr. Billings," that the system "was probably never discussed in *professional* circles until now,"

obviously referred to a general discussion of the subject by American engineers, and not to individual opinions as to its merits. This, I think, will appear from the context, which clearly indicates that the "professional circle" referred to was the "leading engineers" of America, who, Dr. Billings alleged, had condemned the system.

I lay no claim to priority in bringing the matter to the attention of the public, but cheerfully accord to your valuable and enterprising journal the credit of first discussing the system in America. If my additions to what had already been published shall succeed in drawing still further public attention to the value of this system in a sanitary point of view, I shall be abundantly rewarded for my trouble, and the criticisms I have been subjected to.

Very truly yours,

C. W. CHANCELLOR, M.D.,

Secretary State Board of Health of Maryland.

During a recent visit to Europe, I made it my chief study to examine into the merits of various systems of sewerage which seemed to be adapted to the needs and habits of the American people; and on my return home I prepared and read before the Medical and Chirurgical Faculty of Maryland, a paper describing in detail "The Liernur Pneumatic System of Sewerage," solely with the object of inviting attention to its importance, both in an economic and sanitary point of view. For venturing to speak approvingly of this system, I have been assailed by Col. George E. Waring and the partisans of his system, in terms of severe criticism, the accuracy of my statements being flatly denied.

The zeal manifested by Col. Waring in attempting to discredit the Liernur system of sewerage is scarcely to be wondered at. He has a system of his own to maintain, and under the law of "self-preservation," would naturally regard with a jealous eye all other competing systems. But it must be a matter of surprise to all fair-minded men, that Dr. John S. Billings, a gentleman of scientific attainments and a sanitarian of acknowledged ability, should have assumed the *role* of a partisan in discussing various sewerage systems in this city. In a lecture delivered at Hopkins Hall, on the evening of the

21st of November, under the favor and auspices of a great scientific and literary institution, Dr. Billings, of the U. S. Army, in speaking of "municipal hygiene," elaborately described and earnestly advocated what is known as the "Waring small pipe system of sewerage," apparently with the view of influencing the adoption of that particular system by this city, as it is alleged that, "after the lecture was concluded, *Dr. Billings expressed to Mayor Latrobe the hope that he would push the project.*" (Report Baltimore *American*, Nov. 22, '83.) It is possibly natural that this distinguished army officer should be wedded to the Waring system, as he stands committed to it by virtue of having, as a member of the National Board of Health, advocated its application to the city of Memphis, but it is quite inexplicable why he should have gone out of his way to single out another system of sewerage but little known and no where applied in this country, for severe criticism and animadversion.

He is reported (Baltimore *American*, Nov. 22) to have said of the Liernur system: "It is very costly, both for construction and maintenance, and is condemned by the leading engineers of England, France, Germany and America. It removes but a very small part of the polluted house water, and the closets themselves are very liable to be offensive, and would not be tolerated in the better class of houses in this country" Continuing, he said: "I have myself examined the closets in Amsterdam, and should strongly advise against the use of the system in any city of this country, both on sanitary and economic grounds."

If Dr. Billings has been correctly reported, he is certainly deplorably ignorant as to the real merits of the Liernur system of sewerage. I do not know when he made the examination upon which he bases his conclusions and recommendations, but it must have been many years ago, when Captain Liernur's first works were designed only for *testing* the possibility of removing without water, and by a single "main," fæcal matter in a far more concentrated state than common sewage. Certain it is, nothing could be further from the truth than the statements of Dr. Billings, *if applied to the present pneumatic system of Liernur.* Under the guidance of M. de Bruyn Kops, chief engineer officer of Amsterdam, I personally examined

this system in August last, and I assert that which is susceptible of proof, when I say that the system is not only economical in point of construction and maintenance, as compared with other systems, but is, moreover, cleanly and applicable to all the conditions of American life. This statement, so diametrically opposed to the assertions of Dr. Billings, I can, fortunately, substantiate by documents in my possession.

I find that at Berlin there has been, as late as December, 1880, a thorough investigation of the system by a sewerage commission of scientific men, and the report of this commission, signed by the chairman, Dr. A. Schultz, says: "Liernur's water sewers are free from dangerous gases, cannot pollute the soil with fæcal matter, as they do not receive such; they do not require attendance, and *are far cheaper of construction than the water carriage plan*, not only on account of being much smaller in size, but also on account of not needing the expensive structures for entering, ventilating and cleansing. How much is saved appears from the fact that the average cost of the water-carriage sewers here has been £3=$15 per metre, while those of Liernur cost only £1. 5s=$6.25 per metre." Of the "fæcal sewers," the report says: "The fæcal matter being collected in the reservoirs is by means of a pneumatic main dispatched without delay to the central station in order to be converted into poudrette; the gases pumped out of the pipes are burned in the furnaces of the engine, and are thereby rendered inoffensive. Water-closets, like those used in the water-carriage plan, may be applied, and the dilution due to this not only does not prevent the substance being converted into a dry powder, but *this is done so cheaply that its market value is sufficient to cover the cost of working the system, and to pay interest on the capital cost of construction.*" In further discussing the cost of the system, the report says: "In a quarter of Amsterdam, of about 94 acres, the net work of fæcal sewers, with engine-house or air-pump station, and everything belonging to it complete, has cost for construction £2,991=$14,955. The total cost of working expenses in this quarter for fuel, oil, wages and repairs, amounts to £178=$890. This sum divided among the population, viz., 13,860, of the quarter sewered, makes about 3d.=6 cents per head per annum."

"Taking it altogether," continues the report, "the great

advantage of Captain Liernur's plan consists in this, that towns can get rid of their refuse with less building capital, and without the trouble and expense of irrigation fields (or without the pollution of streams), whilst the material produced can be stored by farmers until the time arrives for using it profitably in the customary process of agriculture."

So much for the opinion of the Berlin Sewerage Commission and their general observations on the Liernur system of sewerage, which in itself is sufficient to refute Dr. Billings' sweeping denunciation of the system; but I propose to lay before your readers and the public some extracts from a recent official report of the Mayor and Aldermen of Amsterdam, in reply to a series of questions addressed to them by the city authorities of Berlin, which will still further contradict Dr. Billings' statements. It is unnecessary to give the questions, because the answers will fairly indicate their nature.

1. "Whenever automatic barometric traps are used, instead of valves for locking the branch pipes from the street pipes, the pneumatic removal takes place simultaneously in all the branch pipes of the same street pipe, whatever their number or the length of the street pipe may be. *The good working of the automatic barometric arrangement is fully acknowledged.*"

2. "Experience shows that no stoppages due to the fæcal matter itself ever occur, either in the pipes or in the privies."

3. "Stoppages in the pipes occur but seldom, and the cost of removing them is insignificant, much less, according to our experience, than with brick sewers or earthenware sewer pipes."

4. "Experience shows that it makes no difference in the pneumatic removal whether the pipes receive the fæcal matter in its natural state or greatly diluted."

5. "The pipes keep themselves free from all excremental incrustations or sedimentary deposit. Cleaning with brushes or otherwise has never been required."

6. "In the houses and streets where the works have been executed in conformity with Captain Liernur's plans, there have been, with few exceptions, no complaints. *Nuisance from bad smells and obstructions was only experienced during the experimental state of the system, owing to the provisional nature of the apparatus or to positive abuse, and had nothing whatever to do with the system.*"

7. "The high working expenses *at first* experienced were not attributable to the system, but to the circumstance that the system was applied to various small parts of the city, lying far apart from each other, and without comprehensive plan.

It stands to reason that these expenses will be greatly reduced after the completion of the works now resolved upon, when the various districts will be joined by a common pneumatic main, and thus the vacuum power be concentrated in one engine house."*

This report is dated September 11, 1880, and is signed by Van Tinehoven, mayor, and De Neufille, secretary. A copy of the original can be obtained from the publishers, Wiegandt, Hempel and Parey.

In regard to the closets which Dr. Billings says he found so offensive, Mr. W. A. Power, in an official report to the vice-president of the local government board of Ireland, writes: "I visited several of the pneumatic closets; in some cases they were *slightly* offensive, in others, especially the better classes of houses, they were *free from smell and extremely clean.*" After a thorough investigation of many of the closets, last August, I can and do fully corroborate the statement of Mr. Power.

Dr. Billings asserts that the system is condemned by the leading engineers of England, France, Germany and America. The system is very little known in this country, and was probably never discussed in professional circles until this time, so that it is quite impossible to say that "the leading engineers of Americа" condemn it. There is abundant evidence, however, that some of the most distinguished and "leading" engineers of Europe have given it their hearty approval.†

Dr. Eulenberg, chief privy counselor of sanitary affairs to the Prussian government, writes: "The pollution of streams through the English water-carriage system and other faulty systems of sewerage had long been the subject of serious consideration with this government, until it at length, in conjunction with the proposal to seek relief in the application of the Liernur system, attracted the attention of one of *the most eminent engineering firms of this country.*

*The city of Amsterdam had last summer nearly completed a new central or pumping station for working the system and manufacturing the poudrette at a cost of 400,000 florins, which indicates at least that this city has entire confidence in the system.

†As referred to in the paper on "What shall be done with the Sewage?" preceding number, the "Liernur System" is fully described, with illustrations, in THE SANITARIAN, vol. 7, p. 396, *et seq.*, as it was in 1879.—*Editor.*

"This firm proceeded to make the Liernur system the subject of a most careful investigation, and submitted to me an exhaustive communication, dated 22d March, 1881, relating to a scheme to introduce the system under governmental sanction in the German towns generally. In this communication the engineering firm writes: 'An attentive study of the various writings on the Liernur system, in connection with a professional scrutiny of the inventor's drawings, and a personal inspection of the works executed by him, has convinced us that it satisfies *all claims whatever relating to the question of sewerage;* that it is applicable to cities of every variety of local peculiarity in regard to formation of ground, extension of area and number of inhabitants, and *that it is in a high degree distinguished for ease of technical execution.* It allows equally well the use of water closets and of privies without movable parts, and *permits in both cases all water needed for cleanliness.* It prevents positively every pollution of the town air with sewer gases and the soil with sewage. Finally it is cheaper to build than the water-carriage system, and converts the fæcal matter by a *cheap* and *scentless* process into a dry manure powder of the quality of the best fertilizers in the market, enabling cities (without polluting rivers) to rid themselves of their refuse under conditions at once favorable to their own finances and the agricultural interests of the country.'"

I have probably already produced enough testimony to convince any unprejudiced mind that the criticisms of Colonel Waring and Dr. Billings are thoroughly unjust and without foundation in truth, but I cannot forego giving a few quotations from a letter of Dr. Alexander Müller, the distinguished professor of agricultural chemistry at Berlin, to James W. Southern, member of the sanitary board and city council of Manchester, England, under date of the 15th September, 1882. Dr. Müller says:

"In regard to the cost of constructing the system (Liernur's) I cannot for myself speak authoritatively, but I am free to state that an *engineering firm of high eminence and unquestionable experience* has, after a careful professional investigation of the whole subject in all its details, reported to the Prussian government that it cost *less* to build than the water-carriage system."

Dr. Muller concludes his long and interesting letter, which treats principally of the value of the poudrette manufactured by the Liernur method, as follows: "Summing up, I am bound to declare that for *large* cities I do not know any system of

sewerage which *better* than Captain Liernur's answers all the demands of public health together with comfort and economy, both communal and national." In placing the foregoing facts before the public, I bear fully in mind the contemptuous manner in which I have been alluded to by *The Sanitary Engineer* of New York, of the 29th November, in an elaborate article under the caption "Amateur Sanitary Engineering in Baltimore," wherein COL. WARING'S SYSTEM may be easily read between the lines. The statement that the paper read by me before the State Medical Society of Maryland, in April last, had for "its object the recommendation of the Liernur system for the city of Baltimore" is positively false. I have never recommended its application to this or any other city. It is proverbially unwise for men to prophesy before they know, and equally unwise for a sanitary journal, seeking light and truth, to draw its inspiration from *interested parties.*

C. W. CHANCELLOR, M.D.,
Secretary of State Board of Health of Maryland.
From The Maryland Medical Journal.

EDUCATION AND SANITATION.*

Hon. John Eaton, LL.D., Commissioner of Education, at Washington, D. C., in an address delivered before the American Public Health Association at its session in New Orleans, pertinently said:

"Education and sanitation represent great forces invoked by man in the endeavor to prolong his life and improve his condition: the one, the science and art of culture; the other, the science and art of health. As terms, they may not always have been present in the vocabulary of the ancients; but the ideas they express, the facts which they include, and the objects at which they aim, are ever present in human endeavors, and are as universal in man's experience, as death and sickness and ignorance, which they antagonize."†

Education, from a moral standpoint, prevents or diminishes crime, and as a factor of political economy has received univer-

* Abstract of paper read before New Orleans Auxiliary Sanitary Association, December 20, 1883. By W. H. Watkins, M.D., Sanitary Director.

† THE SANITARIAN, Vol. IX, pp. 105 and 159, *et sequentes.*

sal sanction; and that branch of education which will prevent a death, thereby lessening sickness and promoting happiness, should receive such marked attention as to place it prominently forward as the principal study for our youth.

No branch of a liberal education is complete without a knowledge of "the art of keeping ourself alive and well," and no abler argument is needed to convince the laity that this knowledge has availed for good than the numerous instances which can be pointed out where towns and villages have had their death rates reduced to a minimum by the application of the principles embraced under the significant term hygiene. As justly as the act of homicide is regarded as the most capital of crimes, so surely must the guardianship of health be ranked among the highest virtues.

Doctrinal points of theology and political theories are often the result of the teachings received in the earliest childhood, and nothing is more important than that the child of to-day should possess that elementary knowledge which will tend to promote his salvation from disabling disease. The value of hygiene is and has been practically tested, and, as results can be cited, many needed reforms in legislation, the institution of Boards of Health, regulations in regard to the seclusion of contagious disease and laws controlling the erection of the houses in which we live. But however much has been done by the State, much remains to be accomplished; and until within the family circle, the miniature form of government which, theoretically at least, represents the nation, hygienic laws are modeled and their strict observance insisted upon, can we hope to attain the desirable completeness.

Gentlemen, there are three factors in the teaching of hygiene which possess prominence, and would seem to be natural agents in the extension of this important knowledge—the family physician, the public press and the public and private schools. The infrequent visits of the first of these factors and the special object of his visit generally precludes much information, other than bears on the immediate cause of his visit. The public press, teeming with advertisements and political expressions, seldom finds an opportunity to dwell upon the subject matter of hygiene. To schools, then, must we look for the desired information to the coming man, and to the public schools espe-

cially, and with their directors must remain the praise, should, fortunately, any be due.

The indifference of the average School Board comes like a huge shadow before this much-needed reform, and the inability of the teachers to perform this duty is unfortunately very general. But let the former give his influence and the latter will find the ability.

But popular opinion cannot be otherwise than with the enlightenment of our people in health matters, and, in this city especially, which has suffered more than any other in the United States from pestilence, whose death-rate is so high from diseases largely preventable, whose measure of success and growth is only commensurate with the health of its inhabitants. How can we afford to sit idly by, with our children ignorant of the most important health requirements? Men and women whose views on other subjects are given with a meaning, the result of earnest thought, on questions of hygiene, show a degree of ignorance which, to the professional man, would be ridiculous, were the subjects of less importance to life, health and happiness.

This is not the first, by many times, that this subject has been brought before the Association for consideration. Several members of your Business Committee have given close attention and investigation to it. The medical journal of this city has repeatedly brought the matter before the medical profession, and in its pages can be found an exhaustive review of the text-books on physiology and hygiene, designed for use in schools, by your distinguished co-laborer, Prof. Chaillé. The public press has also advanced arguments in its favor.

The State Medical Society, at the next meeting of the Legislature, will renew its efforts to have laws enacted requiring the teaching of hygiene in public schools of advanced grade throughout the State. It remains for us to make a practical effort to secure its accomplishment in certain schools in this city, and to this end I would move:

That a committee of three be appointed by the chair to confer with the Board of Directors of the Public Schools, to advocate the introduction into these schools of the study of physiology and hygiene.

The suggestions of Dr. Watkins were endorsed by the Association.

SOME NOVEL SUGGESTIONS FOR KEEPING STABLES CLEAN.

PROFESSOR A. S. MUCKSLEY, F.R.S., TO DRS. JOHN C. PETERS AND A. N. BELL, GREETING.

DEAR DOCTORS: Dr. Peters' reply to my first letter was just about what I expected it would be, viz.: marked by plain common sense and some good technical knowledge, with but little tendency to swerve beyond his facts into acutely suggestive and soaring ideas.*

He keeps his eyes, nose and thoughts too much down to the dirty surface of things; and besides is too much inclined to be simply accurate. Now all this is more or less commonplace, however practical it may seem to be.

I had supposed, besides providing good floors and drains, that you and Dr. Peters would have suggested some nice little arrangements more preventive than shovels, brooms and hose. Prevention, you know, is much better than cure. You might have thought of neat water-tight baskets worn under the mares' tails, with drainage tubes leading directly into the gutters. And you might have had something like flower-pots, also furnished with drainage tubes, strapped under the horses' bellies. These ideas are not far off from common sense, for almost all horses are accustomed to collars and breechen straps; and the Persian horse caravans always have some animals garnished with a pot of live coals swung under their bodies, to furnish the lights which Persian pipes so often require. Something like a big smoking pipe, with the bowl forwards and the stem looking backwards, might also do; somewhat like the piper longum and piper nigrum of laboring men.

Just imagine the comfort and cleanliness of such apparatuses, if worn not only in the stables, but also in the streets. They would not be upset oftener than milk-pails are kicked over by

*The poet Wordsworth tells us to be a

"Type of the wise, who soar but never roam;
True to the kindred points of Heaven's Home.

cows. In the meantime, until such advanced notions gain favor with the public, I suppose you drudging plodders will go on in the old-fashioned Dutch slow but cleanly ways, aided by a little good chemical knowledge. The more solid droppings are easily disposed of by tidy people, as you say, provided the rears of the stalls are kept free from bedding in the day-time.

But the nasty fluids are more difficult to deal with, without an extraordinary degree of washing and flushing of stalls and drains; and here is where transcendental chemistry may have to come in. An ordinary horse makes six litres, or about 1½ gallons of urine per day; containing 38 grammes, or nearly 600 grains of urea; and 132 grammes, or nearly 3,000 grains of hippuric acid, together with worse things called extractives; and also kreatin to the extent of 100 to 200 grammes, or 1,500 to 3,000 grains. Now all these things are apt to undergo ammoniacal and putrefactive decomposition, especially as the urine of the horse is always alkaline. Horse urine has not the large quantity of acid phosphate of soda that human urine has, and cannot so easily be kept pleasant and acid by the addition of it. Alkaline fermentation quickly takes place, and the fluid becomes extremely turbid and fetid.

We know that turpentine will give the smell of violets to urine, and that hippuric acid can be converted into benzoic acid and oil of bitter almonds.

I am surprised that you did not even take a hint from Listerine and give us fragrant antisepsis, with thyme, eucalyptus, wintergreen, or horse-mint and peppermint.

You might also have mixed permanganate of potash with your terra alba or lime, and given them a beautiful purple or pink color, which would look so nice in the stables of the rich, who are accustomed to purple and fine linen. But you venture into none of these æsthetic beauties and refinements, but merely strive for Knickerbocker cleanliness and sweetness, and which you would have rival those of the cow-stables of Broeck, in Holland. You try to make colorless and odorless muriate of ammonia in stables by the aid of common salt, and other muriates and chlorides, where you might perhaps easily make acetate of ammonia, or spiritus mindereri, with the aid of good pyroligneous acid, or crude acetic acid, or good wood vinegar. It is only a step farther, perhaps not an easy one,

to make fragrant aromatic hartshorn; but, you will say, where will we get the oils of lemon, nutmeg and lavender, and the citrus bigardia. Aniseed is not very cheap since we have fox-hunting, so *you* cannot well make the delightful German anisated spirits of ammonia, but you might do better with benzoate of ammonia.

Saltpeter or nitrate of potash is cheap, and you might manufacture nitrate of ammonia, from which laughing gas is made, but that might render the horses restless at night. Again, bromine is a cheap and good disinfectant, and you might have bromide of ammonia, which would quiet the animals. Iodine is also a good and cheap disinfectant, and you could manufacture iodide of ammonia, which would perhaps prevent or cure all the glandular affections of horses, including strangles and possibly glanders.

A manufacturer of perfumes selected the ground near Clichy, which is fertilized by the sewage of Paris, for the culture of his most aromatic herbs. The finest mignonette of Covent Garden Market, London, has long been grown upon sewage water soil. Among the Alpes Maritimes, ground fertilized with the waste of human beings produced, for the uses of the perfumers, an abundance of roses and violets. These perfumes should be made in the stables at once, without requiring vegetation, and we evolutionists expect soon to do it. But what will you do with the aqua papaverun, or papa's or poppy's water and rum; or the infusum mulieribum, or even the liquores Gallici, and the decoctum Hordei. Filth is evoluted every day out of nice fruits, grains and meats, and good wine and beer are changed into nasty water, but I am determined to re-evolute all nastiness into nice chemicals and perfumes.

Yours very respectfully,

A. S. MUCKSLEY, F.R.S.

TWO DEATHS REPORTED FROM COAL GAS (in Cleveland report for week ending Dec. 8) were those of mother and daughter in same bed. The stove from which the gas came was a common "base burner," with an added damper in the pipe, which, when turned, prevented any escape of gas by means of the pipe and chimney. This damper was undoubtedly the cause of the escape of gas. The husband and son occupying another bed were rendered insensible, but recovered.

SANITARY QUESTIONS IN NEW YORK.

Report of the Committee on Hygiene, of the Medical Society of New York, Annual Meeting Nov. 26, 1883.

The report consisted of four parts. The first part was by Dr. E. G. JANEWAY, on

MORTALITY STATISTICS AND EPIDEMIC INFLUENCES.

The mortality for the nine months for the year ending September 30th has been less than for the corresponding period for 1881 and 1882. It has, however, been somewhat greater, both absolutely and comparatively, as regards increase of population, than that for the same period in the years 1878–79–80. Then followed figures showing the absolute difference for ten years.

The work of systematic vaccination was begun in 1875 and continues, at the present time. The corps at the Board of Health charged with this work has performed 119,856 primary and 430,783 revaccinations. By the labors of the Board of Health the disease has been checked on all the occasions on which it has appeared. The mortality from small-pox is only one-half to one-fourth what it was in the six years preceding 1877. Physicians should urge this work, as, when small-pox has only prevailed to the limited extent that it has done during the six years just ending, the people become careless, and persuasive vaccination by public authority becomes difficult. It is far more essential to keep up thorough vaccination now than to wait for an invitation after the initiation of another outbreak of the disease, which will find its victims among the careless and the obstinate. Dr. Janeway then presented the mortality tables for measles, scarlet fever, diphtheria, etc., for the three-fourths of each year from 1872–83 inclusive. They showed the fluctuating character of mortality for measles, scarlet fever, and diphtheria, from which it seems probable that, owing to the moderate number of deaths from scarlet fever this year we should witness next year a marked increase for this disease; whereas for measles the probability would be that there would be a considerable diminution. Diphtheria is on the decline, and from the previous course of the disease it

is possible that this diminished mortality may continue for another year or more. Pneumonia has produced 41 less deaths than last year, 235 more than in 1881, and 634 more than in 1880.

During last summer the mortality from diarrhœal diseases had been comparatively moderate. From a comparison of the mortality of these affections Dr. Janeway felt that, making all due allowance for all possible error, a considerable number of lives had been saved as a result of the employment of a summer corps of the Board of Health, and of the active charity of New York City.

With regard to typhoid fever, he feared, owing to the defective water supply, a decided increase in the mortality had occurred. But for the efforts of the Board of Health the disease would have spread greatly, and extended over a number of years. Physicians should see to it that the Board of Health is properly maintained, aided and encouraged in its work. At times physicians have neglected, or, by concealment, have failed to notify the Board of Health of the existence of contagious diseases, with the effect of producing an epidemic in some cases.

The second part was by DR. O. D. POMEROY,

ON SOME POINTS IN THE HYGIENE OF THE EAR.

Ordinarily the ear is not affected by exposure to the air. All tuberculous subjects, those of a strumous habit, and a considerable number who rank as peculiarly sensitive to atmospheric influences, are exceptions to the general rule. Damp air is much more apt to act perniciously than dry air. Sea-bathing is often injurious from the direct application of the cold water to the meatus giving rise to otitis media; or, from the violent concussion of a wave upon the meatus, or the entrance of water into the Eustachian tubes. Fill the meatus with cotton and tell the patient not to inhale water or allow it to get into the mouth.

The effect of loud and discordant noises in the ear is often very pernicious. If the patient is removed from the noise before profound deafness results, he may spontaneously recover a good degree of hearing, or become wholly convalescent. Riding in railway cars with the windows open, ship-calking, and confinement in the never-ending clicking noise of the

telegraph instrument, may act perniciously on the ear. Musical sounds do not seem to do harm to the ears. Monotonous and discordant sounds seem alone to operate injuriously on the ears.

Cannon-firing, or the discharge of firearms, or the concussion of any explosive sounds, especially when occurring unexpectedly, is likely to do great harm to the hearing. It may rupture the drum-head, or at once render the acoustic nerve unfit for functional activity. Hold the mouth open while the gun is being fired, so that the concussion may act simultaneously upon both surfaces of the drum-membrane. The effect of compressed air, as experienced in the ears of divers, caisson-builders, etc., is often very pernicious. The principal mode of obviating such pernicious consequences is to cause a frequent interchange of air between the throat and the tympanum. This is accomplished by catheterization, either with the Eustachian catheter or Pomeroy's faucial catheter, or by Politzer's or Valsalva's operation. Sometimes simply swallowing, either with or without the stoppage of the nostrils, will be sufficient, in going from one compartment of a caisson to another having a different air-pressure.

The ears require to be "changed," as the expression is, that is, induce an interchange of air between the throat and tympanum, so as to equalize the pressure. On the score of violence inflicted on the ear, the common practice of boxing the ears of children is liable to result in serious damage; pulling and pinching the auricles is much to be reprehended. With reference to the prevention of impaction of cerumen in the meatus, disease of the ears for the most part may be predicated when this tendency exists, and no efforts at cleanliness can prevent it. *Sunstroke* occasionally affects the hearing unfavorably.

The third part was by DR. STEPHEN SMITH,

ON SEWER-GASES.

Sewer-gas has been recognized as a powerful factor in the cause of that large class of preventable affections known as "filth diseases." The writer then spoke of the solution of the question of the prevention of the entrance of sewer-gas into dwellings, of the far more important question of ventilating sewers themselves, and of the system adopted by the Department of Public Works for the accomplishment of this pur-

pose. Dr. Smith gave practical illustrations of the evils of the present system of ventilating sewers, that is by means of perforated covers to the man-holes in the streets. He referred especially to Forty-second Street, which is seldom free from the odor of sewer-gases, and frequently for days and nights together the odor is so intense as to raise the inquiry of the residents as to the possibility of the odor from the gas manufactory miles distant reaching them. In damp, foggy weather the residents have been obliged to close their windows at night to shut out the foul odors. He thought it very evident that this method of ventilating sewers is in every respect objectionable. Practically it is equivalent to having open sewers running through the streets of New York. There can be no effective method of removing the gases of sewers exeept by apparatus which is aspirating in its operations. The gases should be drawn out by the action of forces which are constant and altogether independent of atmospheric changes, and delivered into the external air at an altitude which renders it impossible for them to penetrate any room occupied by human beings at any time. The subject above considered ought to receive the attention of the Board of Health. In answer to complaints of citizens, and requests that the nuisances be abated, that body refers to the Department of Public Works. Though the sewers are managed by that department, yet the Board of Health is not thereby exonerated from obligation to protect the public health against the dangers to life or the detriments to health which the Department of Public Works or any other department creates.

The fourth part was by the Chairman of the Committee, DR. S. OAKLEY VANDERPOEL, on

THE HYGIENE OF HIGH HOUSES.

The Committee protested against the erection of high buildings from a hygienic point. *First*, with reference to the inmates. Since the inception of this question in building, no general epidemic—such as all large communities are liable to —has occurred. Isolation of the sick in all such maladies is a prime factor to prevent spread of the disease. In the buildings constructed having so many families, such isolation would be practically impossible. Either through necessary attendance, contaminated clothing, or currents of air, the epidemic poison would be carried to every occupant, and the persons now eager

to secure apartments therein would be as anxious to desert them. The families in the first three stories are to a great degree deprived of sunshine. The importance of this to the thickly denizened population can hardly be over-estimated.

So much of the surface of the lot is occupied both for obtaining room and to give solidity to the high walls, that it becomes necessary to resort to every expedient to procure the necessary circulation of air and ventilation. Chief among these are the air-shafts running from the bottom to the top of all such houses. Into these, windows open either from the inside rooms, or these windows may serve as ventilators to water-closets and bath-rooms. While the houses and plumbing are new, no unpleasant effects may follow this procedure; but, as experience has too often shown, defective plumbing in any of the lower stories will allow miasm to be wafted to every story above through the open windows upon these shafts.

For economical reasons, most of the closets and bath-rooms are placed upon one line of piping. Should typhoid fever, or possibly cholera, occur in the lower stories, and any defects exist in the traps above, the poison would contaminate the apartments so exposed.

Second.—Their influence is more baneful upon the surrounding property and streets. Opposite and adjoining houses receive no direct rays of sunshine. The streets remain damp, and of necessity, more or less filthy. This constant dampness and lack of sunshine is more or less pernicious. All methods of disinfection and destruction of disease germs depend upon the active oxidizing effect of the material employed. In our streets, next to cleanliness, the most important factor in oxidation is the sun's rays.

These evils are not confined to the residents of the high buildings, but to those also on the opposite side of the narrow streets. Private houses, before cheerful and healthy, become gloomy and unhealthy. Fictitious currents of air are established which not only make smoking chimneys, but may reverse the currents from the underlying pipe from the roof connecting with the soil pipe. While apartment houses in our crowded population with limited area may be a recognized necessity, a limit of height, regulated by the width of the adjoining street, should be required as a sanitary necessity.—*From The Medical Record.*

EDITOR'S TABLE.

LIFE AND DEATH IN NEW YORK.

By census under the supervision of the Mayor and Fire Department of New York, completed for the year 1883, it appears that New York contains 102,624 buildings, of which 78,368 are used as dwellings, and the remainder for business exclusively. Of these, 185 only are considered absolutely fire-proof; 65 are dwellings, and 120 business structures. A terribly suggestive showing, when one reflects that 3,742 dwellings and 3,278 business buildings are more than four stories in height, and that not a few in both classes reach ten stories. The awkwardness of escape from such lofty buildings in case of fire has been fatally demonstrated in numerous instances, and the fact that a number of firemen have been trained especially for life saving purposes under these conditions will not materially console the occupants of the loftier floors. Nor is it especially encouraging to learn that, so valuable is space in New York, rear premises have been built upon to an extent scarcely conceivable elsewhere. There are, indeed, no less than 15,798 rear buildings—nearly one-sixth of the entire number—of which 10,594 are used for business purposes, and 5,199 for dwellings. The reader need not be told what sort of dwellings these are. They are, of course, the wretched tenements where poor people are huddled together like animals for slaughter, and where disease and crime are bred to scourge alike the just and the unjust, and to remind the rich, the hard-hearted and the indifferent that human wrongs are redressed by Providence, and that not all the money in the world is a protection from pestilence without sanitation.

Of the total number of buildings used as dwellings, but 49,565 are occupied exclusively for this purpose, the remainder, 28,803, being partly given up to business. Comparatively small as this figure is, it does not fully express the crowded condition of the metropolis. The total number of dwellings occupied by but one family each is only 32,096, very much less than one-half of the entire number. It is clear that the New Yorker no longer follows the Anglo Saxon method of housing

his family apart and intrenching himself in his house as "his castle." The majority of dwelling houses being thus surrendered to more than one family, it follows that the great bulk of the people live *en masse*. In 10,314 houses, the characteristic feature is that at least two families live there; in 16,992 houses, one family occupies each floor, and in 18,966 houses, there are more than one family on each floor. The population represented by these three classes can be guessed at, if we suppose a household or family to consist of six persons, including servants. The remainder will yield the enormous number who are more or less closely packed. If we take the population of New York to be 1,326,000, the average number of occupants of each house used wholly or partly as a dwelling is about 17. For several years past the pressure has been so great upon the area of the city, in spite of the elevated railroads which have opened up a large territory, that in order to remain within reasonable distance of the business centre, the householder has had to content himself with the tenement principle. New York has built into the air as the only direction in which she could spread. There must soon be relief, for it is clear that the limit of loftiness has been reached.

With the facility for expansion which the great bridge ought to give, by connecting the New York Elevated Railway therewith, Brooklyn has room enough and to spare for all of New York's overflow. She has added to her buildings during the past year about 3,000, a majority of which are dwellings. A few of these, it is true, are after the New York stifling tenement house fashion called "flats," but fortunately this class of buildings in Brooklyn is roomy for want of tenants. With a realization of the facility of communication between the cities which the bridge suggests, it is reasonable to suppose that the percentage of persons who would prefer the misery and unhealthiness of tenement-house life in New York to the comfort of a house for each family in Brooklyn, with facilities thus equalized, would be very small. In our January number, the ratio of mortality per 1,000 of population for the year in Brooklyn was shown to be 22.16. In New York it was 25.62. By the same ratio of mortality in New York as in Brooklyn last year, 4,588 lives would have been saved.

By report of the Registrar of Vital Statistics for the year the total number of deaths in New York was 33,982—3,942 less

than for the preceding year. The causes of death as summed up and classified by the Registrar for the last two years were as follows:

	1882.	1883.
Small-pox	259	12
Measles	913	716
Scarlatina	2,066	743
Diphtheria	1,525	909
Membranous croup	729	640
Whooping cough	658	327
Erysipelas	149	173
Typhus fever	65	15
Typhoid fever	362	470
Cerebro-spinal fever	238	522
Puerperal diseases	407	406
Remittent, typho, malarial, &c	540	227
Diarrhœal diseases of children	3,479	2,867
Diarrhœal diseases, all ages	4,050	3,390
Alcoholism	223	218
Rheumatism and gout	184	154
Cancer	731	673
Phthisis pulmonalis	5,251	5,260
Bronchitis	1,583	1,428
Pneumonia	3,470	3,158
Heart diseases	1,474	1,690
Marasmus, scrofula, &c	928	825
Hydrocephalus and meningitis	659	557
Meningitis and encephalitis	741	871
Convulsions	635	516
Sunstroke	103	83
Brain and nervous system	2,971	2,712
Apoplexy	616	524
Peritonitis and gastritis	937	871
Bright's disease	1,856	1,845
Suicide	199	158
Drowning	207	249
Deaths by violence	1,376	1,325
Total zymotic diseases	12,422	9,252
Total constitutional diseases	7,824	7,419
Total local diseases	14,130	13,681
Total development diseases	2,172	2,115
Total deaths from all causes	37,924	33,982
Deaths by ages.		
Persons seventy years and over	2,398	2,333
Children under one year	9,867	8,724
Children under two years	13,462	11,266
Children under five years	17,520	13,770

IMPORTANT CHANGES IN THE ORGANIZATION OF THE HEALTH DEPARTMENT OF THE CITY were made January 1st, ultimo, as follows:

1. In the Secretary's office, one Secretary as heretofore; one chief clerk, who shall be auditing clerk and property clerk, one corresponding clerk, four clerks, one janitor, one messenger and one sweeper.

In the attorney and counsel's office there shall be one attorney and one counsel, one clerk, one chief clerk, two clerks and one messenger.

The Sanitary Bureau shall consist of seven divisions, and in it there shall be one sanitary superintendent, who shall also perform the duties of register of records; one assistant sanitary superintendent, who shall perform the duties of chief medical officer in the fifth division; one chief clerk, as many clerks as the service may require, and one messenger.

The seven divisions have functions as follows:

1. Sanitary Inspection; 2. Adulterations and offensive trades; 3. Public nuisances, matters endangering health, life and limb upon the streets and sidewalks, special indoor inspection &c.; 4. Vaccination and disinfection; 5. Care and maintenance of hospitals for contagious diseases, treatment and transportation of patients; 6. Plumbing and ventilation; 7. Vital statistics.

The chiefs of these several divisions are, with two exceptions, promotions from the corps of Inspectors—of well tried men, practically familiar with the detail duties. The first exception is of the third division, to which Major Willard Bullard, formerly a Harbor Master, has been appointed. Upon him devolves the enforcement of ordinances relating to nuisances exposed to public view as well as special indoor inspections; for this duty he is provided with four special inspectors and thirty sanitary policemen. Executive skill in the use of this presumably competent equipment, appears, therefore, to be what is expected of this important division. The second exception is the Chief of the sixth corps—Mr. J. C. Collins, heretofore a clerk in the Secretary's office. Upon this division devolves the duty of enforcing the laws and ordinances in reference to plumbing and ventilation—the stifling school buildings? Would that there was no reason for raising this inquiry. But

the subject is nowhere else implied in the detail of functions. To this division ten inspectors and three clerks are assigned. The chiefs of the divisions are paid salaries of $3,000 each, and are expected to devote their time exclusively to the duties of their offices, respectively.

FORTIETH ANNUAL REPORT OF THE NEW YORK ASSOCIATION FOR IMPROVING THE CONDITION OF THE POOR, FOR THE YEAR 1883.

This is an unusually gratifying report, especially remarkable for the degree of progress made over any preceding year, and the substantial amount of good accomplished among the most needy—the occupants of tenement houses. First, in regard to buildings, two admirable examples are given. The new structure between Seventy-first and Seventy-second Streets, abutting on First avenue, by the Improved Dwellings Association; and Miss Ellen Collins' Improvement of Tenements of the old style, at the corner of Water and Roosevelt Streets. These structures may well be accepted by the Departments of Health and Buildings as criteria of what all the tenement houses of New York should be, in the promotion of public health. Other tenement house improvements are also reported in lesser degree, but nevertheless encouraging. The criminal obtuseness of New York tenement-house landlords is evidently softening, chiefly through the instrumentality of this excellent Association. Important benefits have also been conferred by the Association in providing seaside excursions for 975 children and 440 adults during the summer. Constant vigilance in regard to filthy streets and nuisances of various kinds, and prompt notification to the proper authorities, have also had a salutary influence throughout the city.

The objects of the Association are succinctly stated to be:

1st. To reduce vagrancy and pauperism, and to ascertain their true cause.

2d. To prevent indiscriminate and duplicate almsgiving.

3d. To secure the community against imposture.

4th. To see that all deserving cases of destitution are promptly relieved.

5th. To make employment the basis of relief.

6th. To elevate the home-life, health, and habits of the poor.

How substantially these objects have been executed is shown by an "Abstract of Relief":

To families, as recorded by months..... 9,646
To families relieved for two or more months... 5,087
Number of separate families relieved 4,559
Amount expended..... .....$27,103.65

A list of members and contributors is appended. Office of the Association, 79 Fourth Avenue, between Tenth and Eleventh Streets.

RAILROAD "ACCIDENTS" IN THE STATE OF NEW YORK.—Among other statistics of public importance, given by Governor Cleveland in his Message to the Legislature, January 1st ultimo, 322 persons were killed and 660 injured in the operation of railroads in the State during only eight months of the year, 506 being employés of the railroad corporations; that there are 8,706 railroad crossings of streets and highways at grade, and only a small part of them are guarded by gates or flagmen. Among other statistics of interest to sanitarians, mentioned by the Governor, are the number of *lunatics* in State asylums and almshouses, 11,270; *inmates* of *penal institutions*, 15,000; *immigrants* landed at Castle Garden during the year, 390,000; immigrants "returned to the places from which they came," 1,273—69 of whom were lunatics.

NATIONAL, STATE AND LOCAL BOARDS OF HEALTH REPORTS.

THE NATIONAL BOARD OF HEALTH PRELIMINARY REPORT, FOR FISCAL YEAR ENDING JUNE 30, 1883.

A pamphlet of 102 pages which gives the operations of the Board during the year, and a general summary of the four years' work under the provisions of the Act approved June 2, 1879. Our readers have been so generally informed of the work of the National Board *au courant*, that little remains to be said about it in this concluding report. Its present status is that of suspension, by omission of Congress to provide means for its continuance, and the diversion of the appropriation which it secured, for the prevention of epidemics, to the Marine Hospital Service.

To sum up: The National Board has been chiefly instrumental in stamping out yellow fever in Memphis; and, in a great measure, protecting it against further epidemics, by aiding the local authorities in sanitary works; in stamping out yellow fever in New Orleans in 1879; in reforming and rendering effi-

cient the quarantines throughout the country; in establishing special refuge stations for infected vessels and the care of the sick with quarantinable diseases with safety to ports otherwise—and hitherto—in dangerous relations therewith; in securing a general co-operation of consular officers for gaining prompt information of epidemics in foreign ports; in establishing a sanitary inspection service of steamboats carrying passengers and freight from gulf ports into the interior, before departure; in establishing an immigrant inspection service, and general sanitary supervision of railroads and traffic in connection therewith, for the prevention of small-pox and other epidemic diseases; in establishing inter-State quarantines and comity between proximate local authorities, instead of the "shot-gun quarantine" obstructions to travel and commerce; in giving aid to various and numerous local boards of health; in the investigation and suppression of epidemics of domestic origin; in the investigation of the sources of impurity in potable water, food, air and soil in various localities; in investigating the relative efficiency and economy of various sewerage systems; in investigating the causes of yellow fever, diphtheria and other diseases, in the midst of their greatest prevalence, with a view to the most efficient measures for their prevention; in creating a popular sentiment throughout the country promotive of general sanitation, individual health, happiness and public economy.

All this, and the catalogue might be extended, with the strictest devotion to the objects contemplated in its creation without regard to political favor or fear. This last named condition, alas, appears to have been its chief ground of disfavor. Mere politicians, and those who depend upon politics for preferment, are alike barren in men and measures competent for public health service.

CONNECTICUT.—The record for the month of November is a decided improvement on that of the preceding one, and the indications for December are favorable. This report has been delayed, owing to the illness of one of the registrars, but it was thought that completeness was worth waiting for, as one great value of these reports is their use for comparison in the future. The report would be much better than it is were it not for the undue prevalence of typhoid fever and of diphtheria in several

places. The infantile mortality, and that from zymotics in Hartford, both largely from the same cause, indicate that there are some general conditions unfavorable to health, as well as those that have been cited as favoring the spread of diphtheria.

While there has been no general epidemic of typhoid fever, it has been one of the prominent diseases of the month. Like diphtheria this is a filth disease, and is largely, if not almost wholly, due to the unsanitary methods we use for the disposal of our filth. The germs of the disease can be destroyed by disinfecting the excretions of the typhoid fever patient, but instead of this they are carried in the sewage to pollute our streams, and by devious ways find their way to some water supply, or stored in some vault until they percolate through the soil into an adjacent well.

While in the ten cities reported there were twenty-four deaths from typhoid fever, in the towns here and there proportionate returns were made. This prominence led to many exaggerated reports of epidemics, like that in Forestville, where there were only three cases as a foundation.

The lesson taught by the prevalence of all diseases of this class is to return the waste products of life to the nutrition of plant life. The chemistry of the plant, maintained as it is by force from the sunlight, can dispose of these products with perfect safety; with the separate system of sewerage, as they have at Pullman, this can be done with a profit.

Diphtheria has been prominent in Hartford, in New Haven to some extent, in New Britain, Bristol and New London. Cases were reported from Thomaston, Westport, Manchester and Hampton. The epidemic in Hartford is decreasing. The total mortality up to December 1st is 158. Contagion has played a more important role than was at first thought. In Bristol three in one family died and three others were very sick. The sink pipes and the cistern overflow pipes empty without traps into a lightly covered cesspool. Further comment is not needed.

There is a great deal of whooping-cough in Thomaston and an epidemic of measles in one school district in Suffield—thirty cases.

Pneumonia begins to assume importance in the returns. Its precursors, bronchitis and influenza, are quite generally mentioned in the reports from all quarters. One singular feature in

the returns from Bridgeport was the number of deaths in aged persons. Thirteen of the thirty-nine were over seventy, and five of the thirteen over eighty-one years of age.

MASSACHUSETTS.—Supplement to Fourth Annual Report of the State Board of Health, Lunacy and Charity, 1883, containing the Report and Papers on Public Health, contains three special papers: Adulteration of Food, by S. P. Sharples, S.B.; Our Eyes and Our Industries, by B. Jay Jeffries, M.D.; Leprosy as Related to the Public Health, by the Health Officer—Samuel W. Abbott, M.D., and two important sub-reports of the Water Boards, Commissioners and Companies of Massachusetts, and on the Sewerage of Nahant. Prof. Sharples affirms that the extent of food adulteration has been overestimated, especially as related to articles injurious to health; the greater number of adulterations being fraudulent only in a commercial sense. He quotes British authorities in support of this conclusion. The chief adulterations pointed out are milk, butter, sugar, wine, spirits and beer, and certain groceries —chiefly spices. These articles he treats *seriatim*. Dr. Jeffries' paper is particularly elaborate, showing the special importance of more attention to the school age—of light and its proper management; school furniture; the paper and type of school books; school hours, terms and exhibition cramming; dust, dirt, foul air and bad position—in school and among artisans—and the color-sense are all discussed in a masterly manner. Dr. Abbott's paper on Leprosy cites a sufficient number of cases among groups of immigrants, in recent years, to show that this disease cannot longer be ignored as one of the imported contagious diseases into the United States, requiring vigilance on the part of all health authorities for its control. The reports of the Water Companies and Boards is in virtue of a law requiring such reports triennially. It is in conjunction with a uniform analytical table upon a plan approved by the Board of Health, for comparison of the waters of the State with one another, as well as with those of other States and countries. The sewerage of Nahant is the outcome of the prevalence of typhoid fever there in 1881, due to filthy surroundings and impure well water. This report is a valuable one as showing the specially bad condition of the town at that time in a paper by Dr. Bowditch on "Sanitary Aspects of Nahant," and

the gratifying redemption of the place by drainage and sewerage, and example of the "Recovery of Soils from Pollution."

A brief statement is made concerning "Commercial Fertilizers or Artificial Manures," with reference to a number of fertilizing works in Massachusetts, which is of general application with relation to the public health. Such works, unless conducted with care, being constantly liable to the charge of "nuisance." The condition of their suppression, according to the law of Massachusetts, is—"If in their" (State Board of Health, Lunacy and Charity) "judgment, the public health or the public comfort and convenience shall require." It not being considered necessary to measure the degree of offensiveness of noxious trades by the standard of the robust laboring-man, especially if he is an employee in a factory of this sort. "A charge of *nuisance* to public health is tenable when a considerable number of persons, whether invalids, persons of delicate organization, or even such as are in perfect health, are so affected that their lives are rendered uncomfortable.

MICHIGAN.—Reports for the four weeks ending Dec. 29, 1883, indicate that pneumonia greatly increased; bronchitis, inflammation of the kidneys, whooping cough, diarrhœa, intermittent fever and influenza increased; and that consumption, rheumatism, remittent fever decreased. Diphtheria was reported present during the period at 33 places; scarlet fever at 36 places, and measles at 20 places. The prevailing winds during the month were from southwest to northwest. For the three weeks ending Dec. 22, temperature lower from week to week; relative humidity, day and night ozone increased. For week ending Dec. 29, temperature was considerably higher, absolute humidity considerably more, relative humidity slightly more, and day and night ozone less.

The regular quarterly meeting of the Board was held at Lansing, January 8, 1884, the following members being present: Jno. Avery, M. D., of Greenville, president; J. H. Kellogg, M. D., of Battle Creek; Victor C. Vaughn, M.D., of Ann Arbor; C. P. Tyler, M. D., of Bay City; and Henry B. Baker, M.D., Secretary.

The Secretary read a resumé of recent work of other boards of health; also, of the work of the office of this Board during the last quarter, which showed that a successful sanitary con-

vention had been held at Ionia; that partial arrangements had been made for holding one at Hillsdale; that the proceedings of the Muskegon, Pontiac, and Reed City Conventions had been printed; that special meetings of the Board had been called at the State Reform School to examine plans for a new building; at Detroit to attend American Public Health Association; and at Ionia at the time of the Convention; that a leaflet on contagious diseases had been translated into French, Danish, Norwegian, and Swedish, for general distribution among citizens of Michigan who speak those languages; that a very general distribution of circulars on communicable diseases and on the work of health officers had been made in Michigan; that notice had been sent to health authorities in several parts of the State warning of the shipment of diseased cattle into such localities; that.the regular distribution of weekly bulletins of sickness and of meteorology, the yearly distribution of material for meteorological reports, and the quarterly distribution of blanks to observers of diseases, had been made.

Dr. Kellogg presented and read portions of a report on the present knowledge respecting diphtheria.

Considerable discussion occurred over the examination of text books on physiology and hygiene with reference to alcohol and other narcotics. Only four books had been presented for examination.

DETROIT'S SEWERS.—"An afflicted Father" has written to the *Evening News* (Jan. 18) about the death of a child from diphtheria, which prevails in his neighborhood, and which he attributes to the filling up of the land occupied by the Union Depot company, creating a receptacle for stagnant water. But on investigation by the Health Department, an old trunk sewer eight feet in diameter, which runs through Eighteenth street from Grand avenue, and serves the diphtheria neighborhood, has its outlet nearly all under water, and was found choked with sewage in a state of seething putrefaction. The Inspector reported: "The manholes are all trapped." "How does the sewer-gas get out?" he was asked. "Through every private drain and lateral sewer into the houses, and there's an inexhaustible supply of it on hand, I tell you."

BOSTON'S NEW SEWERAGE SYSTEM.—The great sewerage system which has been in process of construction in this city

several years is now completed. This system, which constitutes one of the greatest engineering feats of the age, is virtually the West system on a large scale. The main feature of which is to collect the sewage into an enormous well or tank, or a number of such wells, by the confluence of sewers running thereto from all needful directions, with the greatest possible safety to the public health, and with the least possible injury to other interests. And from this tank, by means of powerful pumps, raising and forcing the sewage into the sea; or when this is not available, upon filtering beds for rendering irrigation or other means of disposal.

For this purpose a large sewer has been built along the marginal streets of Boston, intercepting all existing drainage by means of numerous branches and finally terminating in a well and pumping station at Old Harbor Point. Here, four engines, with a daily pumping capacity of 25,000,000 gallons, are erected, together with screens for the stopping of large objects. The outfall sewer, which extends thence to a reservoir on Moon Island, consists of three sections: first, a tank; second, a tunnel under Dorchester Bay; and, third, a large land sewer. At Moon Island, where the sewage is discharged into deep water, there is a large reservoir covering several acres. It has four compartments, and will hold nearly 25,000,000 gallons. Its design is such that it can be conveniently enlarged at any time to double this capacity to meet the needs of the increased growth of the city. A large number of gates are provided for admitting and discharging sewage, which are to be opened by hydraulic pressure, as are those at the pumping station.

The last link in the extensive chain of works is the outlet section, which contains four sewers, so arranged as to connect with the outfall sewer in receiving the discharge from the reservoirs and carrying it out to the tidal current at the end of Moon Island. The entire cost of this system has been $4,544,272.89.

RICHMOND, VA., reports for 1883, population, 70,945. Total number of deaths, 1,839: whites, 777; colored, 1,062. Annual ratio per 1,000 of population, total, 25.92: whites, 19.63; colored, 33.86. Of children under five years of age, 1,225. From zymotic diseases, 409; chiefly diarrhœal, 157; typhoid fever, 58; whooping cough, 54; diphtheria, 30. From consumption,

308; pneumonia, 102. "Total from diseases of respiratory system, 178" (?) The report is wholly statistical, and not perfectly clear. But the large ratios of children under five years of age, and from pulmonary diseases, are alike suggestive of unsanitary conditions.

New Jersey Sanitary Association.

This Association held its ninth annual meeting at Trenton, December 6–7th. The address of the President, J. C. Bayles, C. E., of Orange, N. J., showed the methods by which sanitary information can be popularized. He objected to much of the floating and misleading sanitary items of newspapers as being from sources not reliable, although often good in intent. Sanitary lectures and tracts, and local sanitary associations were earnestly urged. The address well enforced the radical necessity of accurate sanitary knowledge for physicians and in the interests of the public and of the State. A paper by Dr. T. W Harvey, of Orange, N. J., sustained the paludal view of "Marsh Miasm," and also gave some personal experiences as to the power of well water from marshy lands to convey the malarial poison. Apropos to malaria, Dr. H. P. Godfrey, of Camden, read an elaborate essay on germs, and the value of our present knowledge as to them.

A paper by Prof. A. R. Leeds, on "The Agencies, Natural and Artificial, Affecting the Purity of the Passaic River below Paterson," gave rise to an animated discussion, which at length was transferred to the Delaware River and Philadelphia.

Prof. Leeds advocated the exploded doctrine of Letheby, that sewage may be safely discharged into water-courses at the risk of rendering the water non-potable, provided *sufficient* space and quantity of water exists between the reception of fresh sewage and the place of securing potable water. That if these conditions exist the sewage will be thoroughly oxidized and return to its original elements.

The fallacy of this proposition has long since been shown, by instances of typhoid fever poisoning at great distances. And it may be shortly stated, that however true the proposition might be as applied to matter in actual process of putrefaction, or that which is *dead*, if there is any truth in the germ theory evidence is wholly wanting that germs are destroyed by mere

dilution. The argument may be satisfactory to the citizens of Paterson, where the Passaic is a convenient outfall for sewage; but to the citizens of Newark and Jersey City below, who depend upon the same river for potable water, the proposition is already, and very justly, exciting very serious consideration.

"Domestic Wells and Cisterns, and their Best Method of Construction," was well presented by Dr. I. N. Pinkham, of Montclair. The contention was that most open wells are unsafe and must go, and be substituted by the driven well, or the common well closely cemented and arched about six feet below ground. Well-constructed cisterns and the use of cistern water were also commended.

"Appliances for Raising and Distributing Water" were illustrated by Prof. C. L. Brackett, of Princeton, in a most interesting manner. He showed how electrical power, transferred from one dynamo machine to others, could overcome gravity, and how water could be brought for use or removed for drainage from inland cities surrounded by hills, like Mexico. He also showed how sewage in the course of its distribution, as to a river, could, on the way, be greatly purified by small air-pipes all along the course, just touching the sewer stream, so as to secure the effect of the adhesion of air to the flowing liquid and consequent mixture and aeration.

Engineer J. J. R. Lewes discussed "Methods of Sewage Disposal without Discharge into Streams." He agreed with J Bailey Denton as to the power of soils to deal with sewage, chiefly because of the access of air in the soil. He spoke of the various chemicals which will precipitate organic matter, and thought that a new plan of mixing this material with sawdust and then using it for the fires under the boilers of the works promised success.

Prof. George H. Cook, of New Brunswick, discussed the various methods of "Filtration." While recognizing most filters as removing only matter in suspension, he showed the importance of this. Besides, some filters, such as those of gravel, sand, and charcoal give access to air and help oxidation. The value of alum as a precipitant was shown, and doubts expressed whether in moderate quantities there was any objection to its use.

"School Hygiene" was ably presented by Prof. H. B. Pierce,

of New Brunswick, James Green, of Long Branch, and J. Madison Watson, of Elizabeth. Instead of generalizing, these papers proposed a model school-room and model methods of applying physical exercises. A lively discussion was had over the present recess system, Prof. Pierce claiming that, with calisthenics, and with permission to children to go out as occasion might require, there was no need for the fifteen-minute recess. Others advocated a five-minute recess each hour or hour and a half.

The meeting brought together about fifty representative men from various parts of the State, besides a small local attendance. And the character of the papers read, and discussions thereon, on the whole, were of a character eminently encouraging to progressive sanitary work.

Hygiene of the Feet.

The feet are, of all parts of the human body, the most subject to abuse and neglect; and proportionally to deformity, and to being made the inroad to disease.

Much has been written of the wonderful structure and adaptation of the human hand; the foot is merely a modified form of it, adapted to the support of the body in the upright position. It consists of two arches, one from heel to toe forming the "hollow of the foot" longitudinally, and the other of four bones, each bone broader on the upper than the lower surface, forming the "keystone" arch, from side to side. The segments of these arches are filled in with firm elastic tissue, and bound together by strong ligaments in such a way as to equally distribute the strokes of walking, running, dancing and jumping, and to protect every part from shock. It is evident that the less the movements of the foot are hampered, the more graceful will be the carriage of the individual, and the less the danger of deformity and disease. Notwithstanding, fashion, which should be the guardian angel of beauty and grace, is, to the foot, a tyrant worshiped by a host of cripples, waving her wand with such authority that no boot or shoe maker dare disregard her mandates, except by special order for a respected foot; or manufacturer dare put shoes upon the market except such as are better adapted to the promotion of deformity and disease than to protect the foot and maintain

bodily health. It is not deemed necessary to describe the "neatly fitting" boot or shoe, with its narrow sole, pointed toe, and inordinately high heel where the hollow should be, all combined to render the movements of the wearer grotesque; or to refer to the physician's note-book for ingrowing toe nail, corns, bunions, callosities, and toes riding one another, which seek relief; or again, to the influenzas, pleurisies, pneumonias and other inflammatory fevers, and to death certificate stubs—the results of insufficient protection of the feet against cold and wet. Every physician of much practical observation in the climate of New York has a record of such cases.

Some six months ago, while traveling, a professional friend inquired of us for reference to some boot or shoe maker in New York who could be depended upon to make a boot or shoe to *fit* the foot and protect the wearer against such results as have been enumerated. Keeping the object in view, at the recent session of the American Institute, our attention was attracted to a case of shoes, and a notice—"Waterproof shoes a specialty." We sought them by the card, and after careful examination, ordered a pair of "waterproof" boots. Measurement was taken by inscribing an outline of the foot while supporting the weight of the body, and other careful measurements. The boots were ready just in time for the January snows and city mud. They required no "breaking in," for they fitted the foot, were easy and elastic from the outset, and keep the feet dry in all weathers. It affords us pleasure to commend the maker, Mr. Byron G. McSwyny, 240 Broadway. Would that we also knew of some one equally commendable for ladies' and children's shoes. We shall keep an eye to the subject, but meanwhile would say to all, *require* your boots and shoes to be made with due reference to the construction and preservation of the shape of the foot, and protection from dampness. The inconvenience and discomfort of overshoes, as compared with shoes that will resist dampness without them, needs no elaboration.

TABLET TRITURATES, as prepared by Messrs. Caswell, Hazard & Co., New York, appear to be destined to come into general use by the profession, as the most eligible means of administering such medicines as can be prepared in this form. Their advantages can be appreciated at once when they are allowed to dissolve in the mouth or in a teaspoonful of water.

being readily soluble and diffusible by these means. Only the purest materials are used in their manufacture.

MILK ADULTERATION ACT SUSTAINED.—Three persons convicted by the lower court of New Jersey for dealing in adulterated milk, in January, 1883, appealed to the Supreme Court, on the ground that the law was in conflict with the Constitution, as follows:

1. It embraces two objects instead of but one.
2. It provides for the arbitrary divestiture of the property of the citizen without due process of law.
3. It is a judicial act deciding upon the character and admissibility of testimony.
4. It adjudges a forfeiture of the rights and property of the citizen without a trial, without a judicial hearing, and judgment, without due notice and without a trial by jury.

The Supreme Court has recently rendered a decision overruling the exceptions, and confirming the decision of the courts below, concluding as follows:

Now I am of opinion that this complaint described with sufficient precision a violation of the statute, in the selling, etc., of milk which was in fact adulterated by the admixture of any foreign substance....I have already said that the offense under the last section is the sale, or the intent to sell, milk under a certain standard, as registered by an analysis.

VITAL STATISTICS OF IMMIGRATION.

NAMES OF STEAMERS, DATE OF ARRIVAL, PORT OF DEPARTURE, NUMBER OF PASSENGERS, NUMBER OF DEATHS AND BIRTHS DURING THE VOYAGE FROM EUROPEAN PORTS TO NEW YORK, FOR THE MONTH ENDING DECEMBER 31, 1883.

	Vessels.	*From*	*Passengers.*	*Deaths.*	*Births.*
Dec. 3,	Neckar,	Bremen,	624	2	2
" 3,	Alaska,	Liverpool,	283	2	
" 4,	Oder,	Bremen,	322	1	1
" 5,	Circassia,	Glasgow,	123	2	
" 7,	France,	Havre,	397	1	
" 9,	Celtic,	Liverpool,	294	1	
" 9,	Nederland,	Antwerp,	325	1	
" 8,	Werra,	Bremen,	522	1	
" 11,	Gellert,	Hamburgh,	726	1	
" 11,	India,	Hamburgh,	487	4	
" 18,	Bohemia,	Hamburgh,	286		1
" 24,	Gen. Werder,	Bremen,	354	1	
" 27,	St. Laurent,	Havre,	276		1
" 31,	Edam,	Amsterdam,	84		1
			5,103	17	6

FOUR WEEKS, ENDING DECEMBER 29, 1883. Correspondents under this head are requested to send reports promptly.	Total Deaths.	Deaths under 5 years.	Lung Diseases.	Diphtheria and Croup.	Scarlatina.	Measles.	Whooping Cough.	Fevers.	Small Pox.	Diarrhœal Diseases.	Annual rate per 1,000.
Burlington, Vt., 11,364	17	7	4	2	..	..	..	..	..	..	19.3
Boston, Mass., 427,940	782	239	281	85	26	1	8	22	..	24	23.6
‡Lowell, Mass., 68,000	121	30	15	7	..	1	..	7	..	1	22.9
Lynn, Mass., 38,284	54	14	16	3	..	..	..	1	..	..	18.1
Somerville, Mass, 27,651	43	11	14	5	..	..	1	1	..	..	20.0
†Worcester, Mass., 58,295	50	13	11	6	..	..	..	3	..	..	22.3
Providence, R. I., 116,755	154	45	46	4	3	2	..	5	..	..	16.7
New York, N. Y., 1,325,092	2339	793	877	147	31	35	12	43	..	48	22.9
Brooklyn, N. Y., 624,118	944	319	345	63	37	13	14	16	..	13	19.5
§Buffalo, N. Y., 200,000	57	23	17	4	3	2	..	1	..	..	14.2
Rochester, N. Y., 101,900	112	29	24	6	1	1	1	4	..	1	14.2
Albany, N. Y., 90,903	150	40	41	9	9	..	..	8	..	1	21.4
Auburn, N. Y., 25,000	..	..	..	..	..	..	..	..	..	..	..
Yonkers, N. Y., 21,000	27	3	9	2	..	..	..	4	..	..	15.9
West Troy, N. Y., 13,000	23	3	8	2	1	..	..	1	..	..	23.0
Hudson Co., N. J., 204,000	327	91	96	14	5	..	..	15	..	4	20.8
Philadelphia, Pa., 907,041	1504	536	352	174	63	6	2	47	10	10	21.5
Pittsburgh, Pa., 175,000	210	60	55	14	5	5	..	14	..	..	13.8
Erie, Pa., 27,730	36	12	10	5	..	..	..	1	..	1	16.8
*Wilmington, Del., 51,500	54	15	11	8	3	1	..	..	1	..	20.0
§Cincinnati, Ohio, 280,000	89	28	24	4	..	..	..	8	..	2	16.5
Cleveland, O., 194,000	203	..	34	25	..	1	3	10	..	1	13.6
Detroit, Mich., 135,000	187	70	..	..	..	..	..	..	..	..	18.1
‡Indianapolis, Ind., 100,000	115	48	35	10	..	..	..	9	..	2	14.9
Evansville, Ind., 40,000	38	7	7	2	..	..	..	6	..	1	12.3
Rock Island, Ill., 11,650	12	7	2	3	..	..	..	1	..	1	13.3
Chicago, Ill., 560,693	824	384	192	89	43	5	3	63	..	24	19.2
St. Louis, Mo., 400,000	555	223	143	76	25	1	2	29	..	8	20.5
Milwaukee, Wis., 130,000	158	67	34	16	8	5	1	2	..	2	15.8
Omaha, Neb., 45,200	40	15	5	3	4	..	..	..	..	1	11.4
Salt Lake City, Utah, 22,000	26	3	2	..	1	..	..	3	1	1	15.3
San Francisco, Cal., 235,000	376	88	133	4	..	..	..	17	..	3	20.6
Minneapolis, Minn., 90,000	101	31	26	19	1	..	1	3	..	1	14.1
Baltimore, Md., 408,520	667	265	165	72	12	13	12	16	..	6	21.0
‡Dist. of Columbia, 194,910	466	186	156	9	7	50	9	10	..	4	28.6
Richmond, Va., 66,000	120	38	20	2	..	..	..	1	..	..	21.3
Lynchburg, Va., 20,240	41	16	13	..	1	1	..	3	..	2	53.1
New Orleans, La., 221,084	581	121	111	12	2	2	4	43	14	55	34.5
Jacksonville, Fla., 10,000	7	3	3	..	..	..	..	..	..	..	19.0
‡New Haven, Ct., 72,000	95	25	28	4	6	1	1	5	..	..	15.8
‡Toledo, O., 52,000	58	17	10	6	1	1	..	6	..	..	13.3
‡St. Paul, Minn., 42,000	97	43	17	25	1	..	..	2	..	1	27.2
‡Sacremento, Cal., 23,000	44	..	15	..	2	..	1	1	..	1	22.9
‡Los Angeles, Cal., 13,000	39	..	19	1	..	..	..	1	..	1	36.0
‡San Jose, Cal., 15,000	25	..	15	..	..	..	..	4	..	..	20.0
‡Oakland, Cal., 36,000	43	..	15	2	..	..	..	4	..	1	14.3
‡Marysville, Cal.	1	..	9	..	..	..	..	..	..	..	..
‡Stockton, Cal, 12,000	10	..	..	..	..	..	..	1	..	1	10.0
‡Valejo, Cal., 7,000	10	..	2	..	..	..	..	..	..	2	17.1

* 3 weeks; † 2 weeks; § 1 week; ‡ month of December.

TWO WEEKS, ENDING DECEMBER 8, 1883.	Total Deaths.	Deaths under 1 year.	Bronchitis and Pneumonia.	Diphtheria and Croup.	Scarlatina.	Measles.	Whooping Cough.	Typhoid and Typhus Fevers.	Small-pox.	Diarrhœal Diseases.	Annual rate per 1,000.
London, 3,995,814	3283	717	781	90	112	82	71	64	7	35	22.2
Liverpool. 566,753	545	118	..	2	10	25	15	12	4	6	25.1
Glasgow, 515,590	492	88	130	8	13	5	20	12	3	15	24.2
Birmingham, 414,846	360	102	..	2	13	18	7	3	9	4	22.6
Dublin, 349,685	388	70	101	..	22	1	6	2	..	10	28.8
Manchester, 339,252	361	83	..	2	8	22	6	3	..	6	27.7
Leeds, 321,611	311	71	..	2	50	1	8	7	..	4	25.2
Sheffield, 295,497	240	58	..	..	19	3	5	2	..	..	21.7
Edinburgh, 235,946	170	28	28	6	10	8	3	3	..	2	18.7
Belfast, 214,022	218	47	46	..	14	..	9	1	..	1	26.5
Bristol, 212,779	170	55	..	2	2	1	1	..	..	3	20.8
Bradford, 204,807	129	45	..	..	2	3	1	4	..	1	16.4
Hull, 176,296	137	42	..	..	1	..	1	1	..	7	20.2
New Castle, 149,464	151	30	..	1	13	4	3	4	1	2	26.3
*Havre, 105,867	43	15	3	1	..	..	1	2	4	..	21.1
Reims, 93,823	82	16	8	8	1	3	..	2	..	6	22.7
Nancy, 74,954	55	14	9	3	1	2	..	1	..	1	19.0
Breslau, 288,000	296	77	25	15	..	7	..	2	..	15	26.7
Brussels, 166,351	156	36	58	3	..	..	1	2	4	23	28.1
Cologne, 148,640	128	26	12	..	1	1	..	3	..	1	22.3
TWO WEEKS, ENDING Dec. 1, 1883.											
Frankfort, 143,300	94	21	10	6	..	..	..	1	..	1	17.0
Hanover, 128,500	98	18	15	10	4	1	3	2	..	..	19.8
Bremen, 117,577	75	25	7	..	1	..	..	..	..	..	16.5
Dantzic, 114,484	109	33	3	5	4	..	1	..	..	4	24.7
Stuttgart, 109,564	75	34	9	3	..	..	2	..	..	8	17.8
Strassburg, 108,706	83	29	14	1	..	..	..	1	..	13	19.8
Dusseldorf, 104,201	96	34	12	2	..	..	1	2	..	3	24.0
Nuremberg, 103,255	92	31	12	2	1	..	8	1	..	5	23.1
Chemnitz, 102,713	110	39	4	15	2	..	..	..	..	2	27.8
Madgeburg, 101,500	97	35	5	4	5	1	2	1	..	1	24.8
Elberfeld, 100,400	104	34	12	5	9	..	5	3	..	3	26.9
Barmen, 100,000	72	20	6	1	..	..	5	..	..	4	18.7
Altona, 95,600	93	28	14	2	1	6	9	1	..	5	25.3
Aix-la-Chapelle, 88,522	75	19	11	2	..	..	3	..	..	2	22.0
Mayence, 63,222	49	8	9	..	2	..	..	2	..	1	20.1
Metz, 58,567	38	12	4	3	..	..	..	..	..	3	16.8
Amsterdam, 350,202	386	.	..	69	3	16	..	6	..	..	28.6
Rotterdam, 162,139	169	..	..	4	3	..	1	..	1	..	27.1
The Hague, 127,932	89	..	..	4	1	..	1	1	..	..	18.1
Lyons, 376,613	290	..	69	4	..	1	1	2	8	7	20.0
Berlin, 1,192,203	1154	305	69	165	40	17	18	10	..	32	25.1
Hamburg, 479,706	469	114	61	12	12	19	15	10	..	14	25.4
Dresden, 229,500	251	56	13	43	10	2	6	5	..	9	28.4
Munich, 240,000	278	100	50	10	2	8	1	5	..	41	30.1
Leipsic, 160,296	161	56	11	26	4	11	2	1	..	6	26.1
Kœnigsberg, 150,350	182	68	13	11	12	..	4	8	..	9	31.4
St. Petersburg, 929,525	801	239	113	51	15	11	7	30	5	94	22.4
*Bucharest, 200,000	106	34	13	3	11	3	..	4	..	7	27.6
†Paris, 2,239,928	1997	311	220	93	2	32	17	66	6	125	23.7

* Week ending Dec. 8; † 2 weeks ending Dec. 6

LITERARY NOTICES.

CRUISE OF THE REVENUE-STEAMER "CORWIN" IN ALASKA AND THE NORTH-WEST ARCTIC OCEAN IN 1881. NOTES AND MEMORANDA, MEDICAL AND ANTHROPOLOGICAL; BOTANICAL; ORNITHOLOGICAL. Washington, Government Printing Office, 1883. 4to, cloth, pp. 120.

The United States Revenue-Cutter *Corwin* was sent in the spring of 1881 to the Arctic Ocean, in search of the unfortunate *Jeannette* and the crews of two missing whaling vessels. She sailed from San Francisco on May 2, and returned in October, having visited Alaska at intervals along its entire coast-line, from Behring's Straits to Point Barrow, including Kotzebue Sound, also the Siberian shore, from the Straits to the North Cape, landing on Herald and Wrangel Islands, and on returning spending some time at Ounalaska, one of the Aleutian Islands. Science having put the expedition under contribution, this valuable report has been issued by the Government. It contains some very interesting information, consisting of medical and anthropological as well as botanical and ornithological notes and memoranda.

The most interesting portion to us is the first section, by Dr. Irving C. Rosse, who makes a very interesting report of his medical and anthropological observations.

The *Corwin* proved to be a good sea vessel, tolerably dry in bad weather, and her oscillations easy for a small craft. Nevertheless there was abundant opportunity for studying that bane of the sea—sea-sickness—which, Dr. Rosse remarks: "Experience convinces that no drug known to the pharmacopœia will prevent or cure."

A portion of the crew suffered from violent plegmon of the hand, chiefly due to protracted hardship and sea diet, but the worst cases occurred among men whose history revealed the previous existence of syphilis. Another affection which prevailed extensively was a cutaneous eruption attended by excessive itching, attributed to inanition consequent upon protracted sea diet in a cold climate. It was relieved by the administration of magnesia, and the topical application of vinegar

and water. There were a few cases of return intermittent, brought about by wet and fatigue; and the prevailing ailment on board ship—rheumatism. Sanitary improvements of the *Corwin* and other vessels in the revenue service are suggested, by covering the berth deck with a coating of shellac, and ventilation by means of a flue passing up through the side of the ship until it opens just beneath the hammock-rail on the inside of the bulwarks, and covered at the opening with a Venetian blind; and improved lighting by larger air-ports having a glass, convex externally and prismoid on its inner surface in order to facilitate the dispersion of light when the port is closed. He notices the practical demonstration of the well-known fact that our sensations of cold and heat are not regulated directly by the rise or fall of the thermometer, but are largely relative, as a temperature steadily below zero was not only well borne, but did not cause discomfort to the party; he also remarked the curious circumstance that cold weather and exposure were better sustained by the ship's crew than by the natives. On the other hand, when the temperature indicated by the thermometer was 60° (F.) the heat of the sun was almost overpowering to the sailors. This leads to a practical distinction by Dr. Rosse between "physical" and "physiological" heat or cold.

He found that while the ethnical points that distinguish the Eskimo from the North American Indian are distinctly marked, this cannot be said to be the case between the Eskimo and the so-called Tsuchtschi of the Asiatic coast. Reasoning from this and other facts, Dr. Rosse considers them of Asiatic origin, a view which receives further confirmation from their ability to cross Behring's Straits in boats, and from their practice of tattooing themselves, a custom which was evidently brought from Japan. He says: "Natives cross and recross Behring's Straits to-day on the ice, and in primitive skin canoes, not unlike Cape Cod dories, which have not been improved in construction since the days of prehistoric man." Indeed, for some unknown reasons, their development ceased at the hunting and fishing stage; they are, therefore, the living representatives of the race that was contemporaneous with the cave-bear and mammoth in Europe. In some particulars Dr. Rosse differs from other Asiatic voyagers in some of his impressions of the Eskimo, or Innuits, as they call themselves. According to his experience, they do not

have the enormous appetites with which they have been credited; indeed, several of them who accompanied the party invariably ate less than the sailors did. It is true that when half-famished they will eat to repletion; but so will Europeans. He observed that a day's tramp in the sharp crisp air of the Arctic regions will develop such latent gastronomic capabilities in any vigorous man as will surprise him, and the Eskimo are not exceptions to this; but the popular notion of their enormous appetites is set down as a current fallacy, partly due to some of the repulsive articles of their dietary.

Contrary to general opinion, also, it is stated that their intellectual capacity is by no means feeble; they learn quickly, show great aptitude for trade, and acquire languages easily. Examination of their skulls does not indicate the low grade of intellectuality which they are commonly credited with, but they are well formed, and possess large brain-capacity, averaging as high as the French or Germans. They are honest, truthful and good-natured, except when they have been corrupted by the bad examples of white men. Their ideas of family and sexual morality are low, their religion simply Shamanism. He saw nothing that would give foundation for the current belief that the dwellers under the Arctic Circle have less active sexual passions than those of warmer climes. The "heyday in their blood" is not cooled to any appreciable extent by their icy environment. With their intelligence and capacity for improvement, this would seem a most promising field for missionary labor. In the terms of Dr. Rosse, it affords "a brilliant opportunity for some one full of propagandism and charity to imitate the acts of the modern apostles, and extend the influence of civilization to the gay, lively, curious, and talkative hyperboreans whose home is under the midnight sun and on the borders of the Icy Sea." Attention is directed to their mal-hygienic mode of life, and, in consequence, to the terrible ravages made by epidemic diseases among them. They also suffer greatly from the deleterious effects of alcoholic liquors of very inferior character, which are surreptitiously sold by traders under the names of "Pain-Killer," "Bay Rum," "Jamaica Ginger," "Florida Water," etc., which he found to be only cheap alcohol, with a little coloring-matter added. Although the taste is an acquired one, they seem to have an uncontrol-

lable craving for alcoholic drinks, frequent indulgence in which favors their extermination by famine. With regard to the use of alcoholic drinks by Arctic voyagers, Dr. Rosse considers them almost a physiological necessity, if employed in moderation. He believes beer and claret to have especial value as anti-scorbutics, when taken with food, during an Arctic voyage; and he considers that it would be better for the natives, from a moral point of view, if these could be substituted for the adulterated drinks referred to, or used in place of "kvass," a vile native decoction, made from sugar and flour, which are obtained in unlimited quantities from the traders, who are forbidden to deal openly in alcoholic liquors. As Alaska and the Aleutian Islands are now a part of the United States, these reports, records of personal observations of the inhabitants of these places, are of especial interest and value.

The birds of the Behring Sea and the Arctic Ocean were made a subject of systematic study by E. W. Nelson; this paper is illustrated by a number of chromo-lithographs, and contains the results of five years' previous study at Saint Michael's, Alaska, as well as the observations taken upon this expedition. Some botanical notes are contributed to the work by John Muir.

A list of fishes known to occur in the Arctic Ocean north of Behring Straits is also given, and chromo lithograph of *Coregonus Merckii var.*

HEALTH IN THE HOUSEHOLD; or, Hygienic Cookery. By Susanna W. Dodds, M.D. 12mo., pp. 601, extra cloth. Price, $2. Fowler & Wells, Publishers, 753 Broadway, New York.

This book is divided into three parts, designated respectvely: "The Reason Why," "Hygienic Dietary," and the "Compromise," which titles explain themselves. In the first department the author sets forth the evidences in favor of what she considers a pure hygienic dietary, quoting liberally from writers who claim the all-sufficiency of vegetable food, and advocating its superiority to animal food, under any and all circumstances.

Such views are contrary to the accepted teachings of the most distinguished physiologists, and the experience of civilized people everywhere; and are advocated chiefly by persons

of narrow observation and radical notions, who consider the habits of monkeys and uncivilized people, who have no data of health or anything else, the proper standard with which to compare scientific truths. It would be equally logical to contend that cannibalism was the most wholesome of all dietetic practices because our ancestors, the ancient inhabitants of Britain, preferred the shepherd to his flock; and even in later days when one of the daughters of a man who was going to the place of execution for cannibalism is said to have cried out, "Wherefore chide ye with me, as if I had committed an unworthy act? Give me credence and trow me, if ye had experience of eating men and women's flesh, ye would think it so delicious that ye would never forbear it again." Or to contend for an exclusive animal diet because the Indian horsemen of the S. A. Pampas live entirely on the flesh of their mares, and eat neither bread, fruit nor vegetables. Or, again, to limit man's perigrinations, notwithstanding his cosmopolitan nature and omnivorous capabilities, to the range of vegetable food, despite the necessities of Laplanders, Esquimaux and others whose existence depends upon animal food.

Part second consists of receipts, made up in accordance with the limited knowledge of part first; and the "Compromise diet," which follows, consists of directions for preparing a kind of food which the book condemns!

DANGERS TO HEALTH: A PICTORIAL GUIDE TO DOMESTIC SANITARY DEFECTS, by T. Pridgin Teale, M. A., Surgeon to the General Infirmary at Leeds. *Fourth Edition.* 8vo., pp. 192. Profusely illustrated. New York: D. Appleton & Co.

As an aid to the inexperienced sanitary inspector, or to the would-be informed householder on practical sanitation, this book stands unrivaled in object teaching. The admirable illustrations with which it is filled point alike to defects and their remedies—to the hidden sources of disease common to unhealthy houses, and how to get rid of them, in a style so intelligible, and yet so simple that he who runs may read, and gain a fund of information of inestimable value, nowhere else so easily accessible.

RIVAL SYSTEM OF HEATING.—The *North American Review* for the current month has two papers under this head, one by Dr. A. N. Bell, showing the special advantages and adaptations

of stove and furnace heat; and the other by Prof. W. P. Trowbridge, showing the special advantages of steam heating. It is not necessary to say anything of the importance of this subject; it is one which no one in temperate and cold latitudes can afford to forego. And the *North American Review*, in this as in a great many other subjects of great practical importance, shows itself to be eminently worthy of the extensive reputation it has achieved under its present management, for the discussion of timely subjects of universal interest. Of the special merit of this particular paper it would be unbecoming in us to speak. There are besides, in the same number, contributions on "Corporations," Defects in the "Public School System," "Must the Classics Go," "Race Progress in the United States," and John Brown's Place in History, by Carl Schurz, Rev. M. J. Savage, Prof. Andrew F. West, J. R. Tucker, M. C., and Senator J. J. Ingalls.

VETERINARY MEDICINE AND SURGERY IN DISEASES AND INJURIES OF THE HORSE. Compiled from standard and modern authorities and edited by F. O. Kerby. pp. 341, with four colored plates and sixty-eight wood engravings.

This volume is a fitting conclusion of "Wood's Library of Standard Medical Authors," for 1883, which every physician who keeps a horse will not only be glad to add to his library for home use, but scarcely less valuable to him than to the practical veterinarian who is in constant need of a manual of this kind—a volume which comprehends the best practical conclusions on the subject of which it treats.

INDEX TO TRANSACTIONS OF AMERICAN MEDICAL ASSOCIATION VOLS. I-XXXIII.

This is a fitting conclusion to the publication of the Transactions in an annual volume, and useful for all who would refer to this rich cyclopedia of practical knowledge in medicine —including all collateral branches—in the United States, for thirty-three years.

A BACHELOR'S TALKS ABOUT MARRIED LIFE AND THINGS ADJACENT. By Wm. Aikman, D.D., author of "Life at Home," etc. 12mo, pp. 273. Price $1.50. Fowler & Wells, Publishers, 753 Broadway, New York.

This is an excellent book—just such an one as all young

people nearing the bourne of marriage, as well as all those recently married, ought to read. It contains a great deal of practical information, based upon a good knowledge of human nature and close observation, which will not fail to both interest and instruct the class of readers for whom it is intended. It is divided into numerous short chapters, written in a sprightly, cheerful style, brim full of practical suggestions how to make home happy and prosperous.

NEW YORK POST-GRADUATE MEDICAL SCHOOL makes a cheerful announcement that it will remove to an elegant five-story building with a street frontage of ninety feet, in a few weeks. The object of the change is hospital facilities in connection with the school, to enable it to carry out the purpose which its success warrants—a thorough system of practical instruction in all branches of medicine. But we regret to notice that *State Medicine* is still without recognition.

"THE OLD OAKEN BUCKET PARODY, by A Sanitarian," is exciting some controversy among our contemporaries as to where it was first published. Four years ago we received *manuscript* copy signed by J. C. Bayles, and a note from the same gentleman, offering it for publication in THE SANITARIAN. We had never seen it before, received and published it in vol. 8, p. 28, under the impression that it had never before been published. We now learn for the first time, from the *Metal Worker*, of January 5, 1884, that it had been previously published in that paper. Our contemporaries are particularly requested to note this explanation of how THE SANITARIAN was led to suppose that the said parody first appeared in its pages, and to still bear in mind that THE SANITARIAN was no less punctilious at that time than now to render "honor to whom honor is due," but it was deceived.

THE SANITARIAN'S CHANGE.—Many correspondents and the public press will please accept our sincere thanks for their gratifying compliments and kindly notices. Several have suggested *uncut leaves* as an additional improvement, with special advantage for binding. No pains will be spared to make THE SANITARIAN worthy of the high encomiums bestowed upon it.

THE SANITARIAN.

MARCH, 1884.

NUMBER 172.

PHYSICAL TRAINING.*

By D. A. SARGENT, M.D., Prof. of Physical Training and Director of the Hemenway Gymnasium, Harvard University.

It would be an interesting study to look up the history of physical training, and to trace the different opinions, epochs and events which have shaped and characterized the development of this important branch of education. It would be equally interesting to trace the probable influence of different exercises upon the development of a people or a race. From the earliest records of the Persians and the Greeks we find bodily training playing an essential part in the education of youth. Later on we find it assuming a military and gladiatorial aspect under the influence of the Roman emperors. With the dawn of Christianity all kinds of physical exercises fell into bad repute. They were revived again during the middle ages in the form of knightly tournaments, fencing matches and festivals. In the seventeenth century they began to assume an educational and medical aspect in Germany, and were intro-

* Read before American Public Health Association, Detroit, Mich., Nov. 14, 1883.

duced in modified forms into the schools of Norway, Sweden, Denmark, Switzerland, France and Prussia. In England and Scotland they adopted the athletic games of the Greeks and the competitive sports of the middle ages. In America the German system was first introduced in 1825, at Northampton, Massachusetts, by Dr. Beck (afterwards Professor of Latin at Harvard College) who was a pupil of Dr. Jahn's in Germany. Dr. Follen carried on the same system of gymnastics in Boston and Cambridge in 1826-1827. Our athletic sports, *i.e.*, running, jumping, putting the shot, throwing the hammer, rowing, etc., came to us through English and Scotch descendants. Naturally enough, in all ages, the attention given to the body has been dominated largely by the differences in opinion concerning the nature and origin of the mind.

As the same spirit that animated the discussions of the past is present to-day, let us look for a moment at the physiological results of the different schools, as they have made themselves manifest on a colossal scale through a nation's life and history. We shall then be prepared to recognize the virtues and faults of each school, and make a selection of exercises that can be adapted to our own age and circumstances. In developing the body the Greeks had three grand objects in view :

The attainment of individual courage and strength as a means of national defense.

The establishment of a physical basis for mental development.

The cultivation of the beautiful in form and proportion.

How well they attained the first object let the heroic struggle at Marathon answer. As the result of the second aim, the Athenians raised themselves from a condition of semi-barbarism to the highest summit of human intelligence in less than two hundred years. The cultivation of the beautiful gave them the finest proportions ever attained by man, and left to us the grandest specimens of art that have ever been produced.

In course of time, as the nation grew more opulent and luxurious, war and maritime conquest no longer afforded a legitimate outlet for accumulated physical vigor. The intellect found no guiding star in pagan philosophy, and moral sentiments were extinct. The love of the beautiful grew into a love for the voluptuous. As a consequence poor Greece fell a prey

to the "madness of superfluous health," and buried herself in the lowest depths of licentiousness.

The physical exercises of the Roman youth varied greatly from those of the Greeks. The educational and the medical element were wanting, and only the crudest forms of exercises were indulged in. Those who were naturally weak, and in need of special training (among this class Cicero is mentioned) repaired to Greece, where they were soon made strong and vigorous. At a later period scientific gymnastics were introduced at Rome, and for a brief time occupied the attention of scholars and gentlemen. But the spirit of the beautiful which infused itself into the exercises of the Greeks found no sympathy in the hearts of the Roman people. They were by nature stern, marshal, practical, and the energy of the nation was concentrated upon the development of its military legions. The soldiers were trained in swimming, climbing, and the bearing of heavy burdens in view of increasing their strength and physical hardihood, and improving their marching and fighting ability.

The spoils of war brought increased wealth, and increased wealth its ever accompanying habits of idleness and luxury. The scholars and gentlemen gave up their exercise, and sought recreation and amusement in witnessing the physical exploits of others. The gymnasia and training grounds were given over to the professional athletes. These were encouraged and supported by the moneyed gentry who found their return for the interest manifested in the prizes won for them by the athletes in the arena.

With the pugilistic encounters began the gladiatorial combats. These brutal exhibitions aroused the latent animalism of the Roman masses, and led to the most gigantic spectacles of human butchery and carnage the world has ever seen.

Internal strife and reckless dissipation soon followed, exhausting the nation's vital resources, and making the brutal sports of the arena seem tame and undesirable. All interest in physical exercise expired with the downfall of the imperial state. Long before this the spirit of Christianity had begun to make itself felt throughout the Roman Empire. The desecration of physical culture in Greece had made the Christians feel that no good could come from the development of the body,

The Roman persecutions were remembered with bitterness, and the awful orgies of the amphitheatre had made physical prowess appear brutal and revolting. With the advance of Christianity the body began gradually to be neglected and despised. A powerful influence was exerted in this direction by the advocates of the intellectual principle, which had been advanced by Anaxagoras many years before. With the Greeks the mind and body were treated as co-workers, the philosopher and gymnasiarch both giving instruction at the academy and lyceum. But under the new dispensation, body and mind were thought to have separate and opposing interests. In fine, the body was considered the source of all evil, and as such worthy of no consideration. The Platonists, as St. Augustine says, "hold that these our mortal members do produce the effects of fear, desire, joy and sorrow, in our bodies; from which four perturbations, the whole inundations of man's enormities have their source and spring," which, in the light of physiological science, is only another way of saying that the condition of the body affects the state of the mind. Actuated by such opinions, with the holiest and purest of motives, vast numbers of men and women began to withdraw themselves from all society, and to try to live by contemplation alone. Some fled to the mountains and deserts, fed upon roots and grasses, and slept wherever night overtook them. Others buried themselves in convents, caves and monasteries, and mortified the body by hunger, thirst and unremitting toil. Thousands upon thousands practiced the strictest asceticism, not only denying themselves food and sufficient raiment—but, like Simeon on his lofty pedestal, even refusing to wash and be clean.

During this period there was little intellectual strength, no real physical hardihood. Life centered around one idea, and that idea was twisted and contorted by the fervor and zeal of an over-stimulated emotional nature. In a few centuries more fanaticism ran wild. Nations, like individuals, became possessed of strange delusions and morbid fancies. Millions of persons were simultaneously crazed with nervous excitement and emotional recklessness. Then came those terrible moral epidemics, which have blackened the pages of history and hampered the progress of Christian religion.

Why need we speak of the "Trials of Innocence," the "Cru-

sades," the "Black Death," "The rise and spread of the Flagellants"—"The wholesale murder of the Jews," and "The Dancing Mania." All of these cruel delusions, pathologically speaking, come under the same category. All are attributable to the same physical conditions. Suddenly the excitement abated, a brief prostration followed, and the people awoke from their hallucination, as if from an ugly dream. With the dawn of chivalry physical exercises were again revived, and fashioned after the spirit of the age. With every knight, his house was his castle, and there he felt bound to defend himself. Individual prowess was the backbone of chivalry, and, consequently, every exercise which was calculated to give it, was practiced assiduously. Here we have fencing, boxing, wrestling, horsemanship forming the essential part of their system of training. And dancing must also be added, as an adjunct to their professional distinction, "as the champions of God and the ladies."

The highest interest in these accomplished exercises continued until the downfall of the feudal system. A few centuries later, great interest was awakened in physical training in Germany by Frederick Ludwig Jahn. His system was modeled somewhat after the Greeks, with the athletic spirit left out. To develop the body and mind together was the primary object. To accomplish this purpose gymnastics were introduced into the schools, and exercises in declaiming, singing, etc., were made a part of the regular curriculum in the Turn Halles and at gymnastic societies.

Interesting allusions might be made to the influence of early physical training on the development of the intellectual life of Germany, but that would be foreign to the main object of this paper.

At the time Jahn began to establish his Turnplatz in Prussia, Germany was suffering under the galling oppression of the French, by whom they had lately been subjugated. Societies were organized for the purpose of producing a closer union among the young men, and arousing them to patriotism. The corrupt refinements of French manners, which had been introduced into Germany prior to the revolution, had weakened and relaxed the sinews of her youth, and left them sickly and effeminate. Jahn was prompted with the desire to stay the demoralized

tendencies of his countrymen, and to morally and physically regenerate them. With this object in view he set to work. The result of the late Franco-Prussian war furnished us the sequel. But how were these desired results brought about? In looking over the physical exercises of the Germans, we find but little stress put upon individual feats, but great attention given to class and squad exercises. The posturing and pyramiding which owe their development largely to the Germans, illustrate the point which we wish to make. Here the success of the tableaux, grouping or act, as a whole, is the thing to be desired. Each participant becomes a unit, and sinks his individuality for the good of the cause. Perhaps the figure is a pyramid, one man may be drawn for the base, another for the middle, and a third for the apex. There are no best places, for all are equally important. If one fails the figure is incomplete. Success depends upon a joint interest and mutual responsibility.

In the Scottish contests, and British sports and games, we get the antagonizing spirit and mutual fellowship interest combined. In one case a man represents himself, in another case his club or fraternity.

In the early history of American settlements we find no necessity for physical training. Breaking up ground, clearing forests, and hunting Indians gave our forefathers all the exercise they needed, and the domestic duties of a frontier life kept our maternal ancestors free from nervous debility and muscular feebleness. With increased wealth, division of labor, and intensfied mental life, came the necessity for more physical exercise.

How to meet this necessity is the problem before us. In briefly reviewing the subject from its historical standpoint, we get a comprehensive glimpse of possibilities, and are better prepared to deal with drifts and tendencies. The life of a nation, and the transactions of an age, bring to light characteristics which are often masked in the life of an individual, and when reviewed retrospectively the relation of cause and effect are more clearly discerned.

The Greeks have taught us the danger of supreme physical development without moral stability. The Romans have shown us how easily refined sensibility can become blunted,

and coarse animal instincts gain the ascendency. The early Christians have taught us the perils of neglecting the body, mortifying the flesh, and long suppressing the natural sympathies and emotions. In the bold, dashing and gallant knights we get the reflex influence of the accomplished arts, fencing, boxing, horsemanship, etc., which flourished in the age of chivalry. In the stolid but persistent drilling and marching of the German youth, in their feats of the *Turnplatz*, requiring unity, strength, solidarity, we get the key to the same qualities which have dug down into the depth of science and literature, and placed their nation at once in the foremost ranks of the military and thinking world.

In the foot-ball games of Rugby and Eaton were developed the grit and tenacity that changed defeat to victory at Waterloo. The cricket matches and boat races at Oxford and Cambridge trained to vigorous manhood the champions of the church and the crown of England.

In reading the works of Scott, Christopher North and many of the Scottish divines, who can help thinking of their power in putting the shot, tossing the caper, and throwing the heavy hammer?

Thus it is with every kind of physical exercise; the qualities at first required are the qualities at length developed. Knowing what is desired it is an easy matter to prescribe the appropriate training. In this very fact lies an element of danger which is well for us to consider. There should be a better understanding as to the physiology of exercise, a recognition of the supreme value of unity in development, and more information as to what constitutes the normal man for different races, ages and conditions in life. Until these questions are settled there will continue to be the widest differences in opinion as to the kind, amount and place of physical training in a scheme of education. The present aspect of the subject in Europe and in this country furnishes illustrations to the point. Germany, tired of the dull stereotyped exercises of the Turnverein, is making a plea for sports and games. England, perplexed with athletics run wild, is attempting to substitute a rational system of exercise for competitive sports.

While France and Sweden are beginning to realize that calisthenics and free movements, though beneficial to the culti-

vation of the graces, afford little or no exercise as such. These are the nations which have given us our ideas of physical training. In the West the German system of gymnastics predominates. The calisthenics and free movements of the French are largely taught in the fashionable seminaries of New England, while the English sports and games are almost confined to the higher schools and colleges of the Eastern and Middle States.

Inquire into the success of these three systems as adopted in America, and you will hear each one upheld by its exponent, but investigate, and you will find in every case the same defects and tendencies that are now being recognized in the nations of their birth. Yet no one will deny that Germany, France and England have done much for the physical training of their youth. In fact, the peculiar system of exercises adopted by each nation, as we have shown, has been the means of intensifying, as it has been the outcome of, the national type. But unfortunately what was thought to be the strength of each system has proved to be its weakness. As long as they were little practiced the world knew nothing of their defects, but as soon as they began to receive more attention their special tendencies and peculiar developments made themselves manifest. Every advancement in the art of gymnastics, calisthenics and athletics, as in every other art, is attained at the expense of individual completeness and a harmonious development. When excellence in the accomplishment of particular feats and maneuvers is made the primary object of physical training, special powers must necessarily be cultivated, and the result in the end will be injurious, and not beneficial, to health.

To enlarge upon this point it would be necessary to consider the physiology of exercise, and to examine in detail the defects of the national training systems of which we have been speaking.

What America most needs is the happy combination, which the European nations are trying to effect. The strength-giving qualities of the German gymnasiums, the active and energetic properties of the English sports, and the grace and suppleness acquired from the French calisthenics, all regulated, systematized and adapted to our peculiar needs and institutions.

The highest development of strength, activity and grace is not compatible in the same individual, and consequently many

persons prefer to sacrifice one in order to gain the other. But robust, vigorous health is only maintained in a body in which life's forces are well adjusted and well balanced.

The inevitable tendency of all progress is to break down this equilibrium, and to make a man a unit in a great organism in which he is forced to fulfill some specific function for the benefit of the whole. The external struggle for existence, apart from health considerations, no longer requires a strong, well-balanced man. The division of labor has been carried to such an extent that it is possible for one to earn a livelihood by the employment of a very few muscles and faculties. When once a man's occupation furnished him all the exercise he needed for the maintenance of health, he is now obliged to give what health he has to his occupation, and trust to other resources to make up the deficiency. This is an evil recognized by the political economist—but they tell us that our schools and colleges, gymasiums, athletic sports, and popular games and amusements, train all the faculties of mind and body, and prepare one to resist the health-destroying tendency of one-sided occupations.

But they forget that these institutions are governed by the same spirit that governs the world at large—competition, rivalry, personal vanity and the love of personal distinction—a passion for excitement, and a desire to accomplish some great feat, to win a prize, or the money equivalent, or gain celebrity at all hazards. These are the motives for physical effort which are back of most of our gymnasiums and athletic associations. In *themselves* these motives may not be deemed unworthy of approbation, and they have undoubtedly incited many a listless man to effort. But when we consider that the primary object of physical training is the strengthening of weak parts, the unfolding of latent powers, and the full-orbed and harmonious development of the whole organism—when we consider that health, strength and the capacity to work long and well are the great things to be desired, it will readily be seen that there is a growing inconsistency between the ideal to be attained and the methods of attaining it. Specializing in the athletics will prove as injurious to health as specializing in business. Prolonged practice of a skilled sport is as trying to the nervous system as the practice of a skilled profession.

Raising the standard of a game limits the number that can

play it, and reduces its value as an exercise and a recreation, making victory the primary object, and health and development secondary considerations, opens a way for professional trickery, exacts more work than is necessary for the welfare of the body, and invites dissipation after the victory is won. Yet these are the unmistakable tendencies which threaten to impair the usefulness of some of our popular physical exercises, making them sources of evil, rather than sources of good.

To prevent this tendency and to make these powerful agents contribute their influence towards the upbuilding of character and the development of the physique are problems worthy the consideration of all.

Inasmuch as our college students raise thousands of dollars annually for the support of athletic organizations, and are lampooned throughout the country for the excessive interest they are supposed to take in physical exercise, it might naturally be suggested that the reform begin with them. But having stood at the door of one of our largest universities and examined thousands of youths as to their health and physical capacity, we feel prepared to say that the reform should begin in homes and preparatory schools. Students enter college trained in mind but not in body, and where one fails for want of mental ability ten break down for want of physical stamina. Many are short in stature for their age, or tall and slender, with a deficiency of muscular strength. Under an appropriate system of physical training, however, they make most rapid advancement, showing that their bodies had been kept in arrears while their brains were developed. Many are ignorant of the first principles of physiology and hygiene and leave school with acquired defects which are past remedying, but which a little appropriate knowledge and training could have obviated. Not infrequently the students who stood the highest in the preparatory schools are taken with a sort of mental dyspepsia after entering college, and devote most of their energies to physical exercises. This is invariably the case where the preparatory training has been forced and unnatural.

If you approach the teachers on the subject of physical training, most of them will tell you frankly, that the school curriculum is made up of so many studies, that they have so many hours to teach so many branches to fit a youth for the next

grade, or to prepare him for college, and that if a pupil break down in his attempt to keep up with the requirements, he must drop out, and let his parents and physician take care of him, for they hold that the teacher's province is to train the intellects, and not the bodies of his pupils.

Unmindful of the fact that the intellect is sustained in its function by the same heart, lungs and stomach that sustains the body, that the period of youth is the time nature has set apart for the growing, strengthening and perfecting of the vital organism, and that ninety-nine out of every hundred that graduate from our public schools must necessarily earn their livelihood in occupations where health, physical stamina and power of endurance, with ordinary intelligence, will count for more than highly developed intellects without the sound physical basis. Inasmuch as millions are being expended annually upon the education of youth, who either break down in preparing for their life's work or are rendered useless or inefficient from the want of a little health and vigor, it would seem that physical training in its broadest and noblest acceptation should form a part of the regular school curriculum.

But such a training is not to be procured simply by making physical exercise a requirement. There must be intelligent direction behind it, a thorough knowledge of the human organism, and a wise adaptation of means to ends.

This can only be secured by creating a public sentiment that will place every school in the country under the care of a medical supervisor.

Shame upon the civilization that puts a premium upon sickness, suffering and death, and compels the physician to sit in his office and wait serenely for the onslaught of disease, which a little timely advice from him could have obviated. The highest province of the physician is to improve the hygienic conditions of the individual, the sanitary condition of the community, and to prevent disease wherever and whenever it is possible. In order the better to discharge his humane office, he should frequently be invited to examine the children and their surroundings. He should be familiar enough with health to know it when he sees it. He should be educated to deal with physiological problems, before they become pathological.

His work should be supplemented by the intelligent co-operation of parents. They should know something of the lives of their ancestors, and their mental and physical characteristics, their nationality, occupation, and the healthfulness of the town or city in which they were born. Parents should note the same facts with regard to their own lives, keeping a history of their accidents, diseases and mental and physical conditions before and after marriage. The same information and more should be recorded respecting the lives of the children. The weight should be taken at birth, and the head, body and limbs carefully measured.

This process should be repeated once a year at least throughout the whole period of growth and development. The various stages of dentition should be noted, the age at which the child begins to walk, the resemblances to father or mother and the dawning of hereditary traits.

After three or four years, the relative proportions of the different parts of the body should be determined, and the annual rate of increase in height, weight, strength, chest girth, etc., should be carefully ascertained and recorded. A history of the children's diseases should be kept, and the peculiar taste and idiosyncrasies that accompany them.

The first appearance of morbid tendencies, perverted growths and malformations should be noted, and judicious efforts made to correct them. In early life a child should be taught to respect his body, to pride himself upon the purity of his skin, the firmness of his muscles, and the uprightness of his figure.

If the house be provided with a play-room or a family gymnasium, well and good; if not, under the skilled directions of an enthusiastic parent, the doors and windows, chairs, tables, stoves, beds, etc., may be made to furnish appropriate exercise for the youngster. The will is wanted, that is all. With some children it is better to trust largely to the play impulse, being careful to direct it into proper channels, and to keep it within bounds. Once inspire a boy with the idea that strength depends upon health, and both upon exercise and the right care of the body, and you have lifted from his heart the burden of labor, and taught him the practical value of cleanliness, temperance and self-mastery. Let a few enterprising families carry out this regime for a while, as they have in England and some

parts of this country, and a public sentiment will soon be aroused that will carry the good work into the schools. This condition of affairs would presuppose the appointment of medical supervisors with their trained assistants, or teachers skilled in physiological science, and well equipped gymnasiums and play grounds.

In order to have some basis for classification it would be necessary to have physical examinations at the outset. If the physician in charge has had much experience in his position, he has computed his tables, and knows the normal condition of the typical boy for every age, nationality and class in life. The facts solicited concerning family history, heritage, diseases, etc., will give him important information as to natural resources. Then a test of the strength of various parts of the body should be made, and compared with the development of corresponding parts. A test of the muscular sense, difference between right and left hand, power of the will over the muscles, etc., would add greatly to the value of the data. An examination of the heart, lungs, liver, etc., should be made as far as practical, and the condition of the skin, circulation, respiration and relative size of body and limbs, etc., be carefully noticed. The value of this work would be greatly increased if efforts were made to ascertain the size of the vital organs for different ages and conditions at autopsies. A disproportion in the capacity of the heart, lungs and blood vessels undoubtedly lessens the range of ability, and often invites disease.

From the data ascertained it is possible to form a fair judgment of the pupil's condition. The course to be pursued is shaped largely by the results of the examination and the ideal to be realized. The first object is to break up morbid tendencies, strengthen weak parts and start the youth on the road to vigorous manhood.

Unfortunately, nature has not dealt equally with all, and, in many cases the differences at the outset cannot be overcome in a lifetime. Some she has richly endowed with splendid gifts, others she has left only an inheritance of evil. To some she has bequeathed health, strength and ability to work—to others disease, feebleness and capacity to suffer. For some she has opened up glorious possibilities, and paved the way to grand and lofty achievements. Over others she has placed her

cruel restrictions, and established boundaries which never can be surmounted with safety. It may do in a political sense, to say that all men are created free and equal, but it cannot be proclaimed in truth physiologically speaking. One of the saddest lessons an ambitious boy has to learn, is the physical difference between himself and his neighbor. But he should be taught to accept it manfully and courageously, and be true to his own type and his own organism. Knowing the true condition of the individual, and the training most suited to his particular case, it is necessary that the physician in charge have some knowledge of the appliances by which specific results may be attained. This knowledge, in a limited degree, is possessed by professional trainers, prize-fighters and men of this stamp, but has never been considered worthy the attention of educators and men of science. As a consequence our youth have been left to choose their own methods of training, or have been forced through some stereotyped system which has been adopted on grounds of economy.

Not infrequently they have been advised by parents, teachers or physicians to take exercises that have aggravated natural defects, and imperiled their health and happiness for a lifetime. Under the personal direction of an intelligent enthusiast, an ordinary school-room, as well as any other room, will furnish ample facilities for healthful exercise. Seats, desks, books, windows, doors, etc., all can be made to contribute their share to the development of the body.

But such ability finds a more lucrative field elsewhere, and under the guidance of the regular teacher, the school furniture soon assumes its customary function. No physical exercises are better adapted to school purposes than those of the modern gymnasium. The grand aim of this institution is to give a boy a harmonious development, and all its apparatus is arranged with this end in view. Many of its appliances are especially designed to strengthen natural weaknesses and remedy natural defects. On some of these machines the condition of the vital organs may be affected by localizing the resistance to be overcome, and by carefully regulating the time, rate and manner of movement.

There need be no fear of over-exertion, as the apparatus can be adjusted to the strength of the strong and the weakness of

the weak. But the gymnasium does not stop in its usefulness with the strengthening of local weaknesses, and the relief of natural or acquired defects. It affords an admirable opportunity for exercise to all classes, at all times, and all seasons. It can be adapted to the use of large numbers, its courses may be arranged in a progressive series, and all its exercises may be so regulated and systematized as to be made highly educational. The periodical examinations and measurements which should furnish the basis for such a system, should also determine its direction and limitation in special cases.

If the gymnasium is not properly equipped, and the pupils are obliged to adapt themselves to the crude appliances with which these institutions are usually furnished, it will fail to meet the wants of the classes most needing the training, or, if the examinations are dispensed with, and the accomplishment of feats, the winning of prizes, and the gaining of popular approbation are made the chief incentives to effort, then the gymnasium will become a training school for specialists, the great majority of pupils will want a motive for faithful work, and the primary object of its existence, the symmetrical building of the body, will never be realized.

Though the gymnasium affords the best means of physical training from the educational standpoint it is not complete in itself, and should frequently be supplemented by other exercises. The monotony of its mechanical movements should often be relieved by recreative sports and games. But here you enter the realm of special exercises, and they should be used judiciously. Did the time permit we should be pleased to show the effect of various exercises on the same individual and of the same exercises on different individuals. Horseback riding, bicycling, skating, etc., are powerful specifics and furnish the best exercise possible for certain conditions. Many of the so-called physical exercises, like military drill, owe their value in education to the moral training and discipline they exact, and not to their effect upon the development of the body. Not a few of the exercises supposed to be recreative, really give more employment to the brain and central nervous system than they do to the muscles.

On this ground objections may well be made against the extreme development of competitive sports and highly artistic

games in our schools and colleges. The intense rivalry, social pressure and popular glamour which is behind these exercises, prompts the young athlete to train more vigorously than he naturally would, and the expectation of victory or defeat, with the accompanying excitement, keeps the subject constantly before him. If he tries to do conscientious work in his studies he makes a double draft upon his system, and is liable to break down during his training. At the same time the value of competitive sports must be recognized. They are splendid aids to discipline and tide the young over a dangerous period. They develop patience, perseverance, courage, presence of mind, and many other qualities of great value in the struggle of life. They are too important an adjunct in education to be allowed to lose their influence by being carried to excess. Efforts should be made to regulate and control athletic exercises before a reaction sets in against them. It should be the duty of the medical supervisor to acquaint himself with the nature and character of all exercises and games. He should also know their specific value as a means of developing the different parts of the body, and he should be able to judge of their physiological effects upon different constitutions. He should be thoroughly posted on dietetics, bathing, sleep, clothing and other health topics, and should be able to give discriminating advice as to the use of these important agents.

Armed with this knowledge, and the data obtained from the physical examinations, a course of training can be prescribed which will not only tend to make the weak strong, and the strong well, but a course which will actually attack the incipient forms of diseases and fortify the system against the evil tendencies of our civilization.

Some of the more conservative of my hearers may say: "Such an elaborate system has much to commend it in theory, but it is thoroughly impracticable." To meet this objection perhaps a brief review of what it really is doing will not be out of place. This system was introduced into Harvard College four years ago upon the completion of the Hemenway Gymnasium. Up to that time the old gymnasium was used almost exclusively by the members of the various athletic organizations. At the present time the new gymnasium is used by more than 80 per cent. of all the members of the College. The

attendance is voluntary, and no inducements are held out by the authorities, except the physical examinations, and the benefit of personal supervision and advice.* But this system is not confined to Harvard, it has already been introduced in a modified form at Haverford College, Lehigh University, Boston University, and at several theological seminaries, preparatory schools, private schools, and academies. John Hopkins University, Cornell University, and Amherst and Yale Colleges, are making preparations for it. Wellesley and Smith Colleges, devoted to the education of women exclusively, have this system, and Brynmawr, a newly-founded college for women, in Philadelphia, is having a gymnasium built expressly for it. Many of the city gymnasiums, including the Union, of Boston, with a membership of nearly a thousand, have entered thoroughly upon the good work. The great athletic associations of the country, including New York, San Francisco, St. Louis and Montreal, are adopting the new methods. The Montreal Club has risen to the dignity of the occasion, and appointed a medical director. Sanatory gymnasiums, founded on this system, for women and children have been opened in several cities in the East, and efforts are making to carry the work into various hospitals and asylums. In fact, from every direction there is an increasing demand for just such a system as we have been advocating. The difficulty is to find well-trained, enthusiastic and intelligent exponents of it, for the field of preventive medicine is not a lucrative one.

"The object of the American Public Health Association is the advancement of sanitary science and the promotion of organizations and measures for the practical application of public hygiene."

Whatever is thought to be detrimental to the physical condition of the community, or likely to invite disease, is thoroughly discussed, and measures are usually adopted for having the evil removed. That much good has been accomplished by this great sanitary movement no one can deny, but in spite of every effort to improve the conditions of the public health, thousands die annually of zymotic disorders in communities

* The result of this work is making itself manifest in many ways, and we shall hope to publish a detailed account of it at no distant date.

where no immediate cause can be found, while thousands live on in seeming defiance of disease and death, amidst the filthiest surroundings. One person contracts a fever, another diphtheria, and a third continues in good health after being exposed to the same atmospheric conditions, and subjected to the same deleterious influences.

These are cases which frequently occur to the practicing physician, and point to causes beyond the realm of external observation.

We must often look to the condition of the individual and study his physical structure, functional peculiarities, inheritance and personal history, if we would get at the real cause of disease. It is the weak part transmitted or acquired which is first to invite disorder. We know of no better way of finding this vulnerable part than by physical examinations, taken in connection with such a history as we have described. If all the health associations could be induced to use their influence, as some are doing, in carrying on the examinations in schools, factories, asylums, hospitals, penitentiaries, among seafaring men, railroad men, professional men and through all the diverse trades and industries—we feel convinced, from our own experience, that the data would be invaluable. If, in connection with these personal examinations, small circulars could be issued, giving a few words of practical advice on the care of the body, adapted to the peculiar wants of different constitutions and circumstances—an interest would soon be awakened that would greatly improve the physical condition of the masses and found a basis for a higher moral and intellectual life.

THE SANITARY RELATIONS OF GEOLOGY AND TOPOGRAPHY.*

By P. J. FARNSWORTH, M.D., Clinton, Iowa.

The geological and topographical features of a country determine, in a great measure, its sanitary conditions or capabilities. They characterize the soil drainage and water supply,

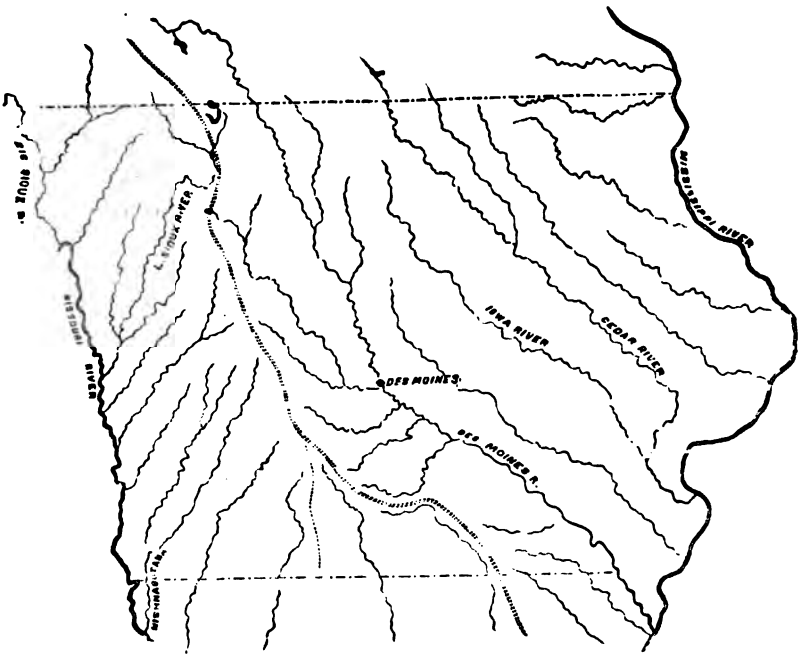
* The geology and topography of Iowa in a sanitary point of view. Prepared for the Iowa State Board of Health.

the temperature, moisture and other qualities of the air, and the kind and quantity of the productions. They are, therefore, important elements in the consideration of the health and prosperity of a State, and merit a careful study. A subject so extensive requires a large collection of facts, some of which are accessible, others are yet to be obtained. We can, therefore, only treat it in a general manner. We can glance at primitive conditions and draw some probable conclusions from them; but a more extended record of observations must be made to determine the effects of added settlement and cultivation.

If we go back for a period of a little more than 50 years, the Territory of Iowa was in a state of nature; it had primitive soil and virgin prairie. It then became open to civilization, to men who dispossessed the nomadic Indians and the roving buffalo, who were to cultivate the earth, build towns and cities, and render their surroundings sanitary or unsanitary, as their knowledge or ignorance prompted them. In fifty years the whole State has been brought under cultivation, the face of nature changed, the soil upturned to the sun, the marshes drained, trees planted, and the vegetation altered. How far the natural surroundings are affected by artificial conditions must be determined by facts in process of accumulation. We are to consider the natural features, the geology and topography, and their relations.

Iowa is a part of the great inter-continental plain or plateau of North America. In shape it is nearly a parallelogram; its northern boundary is 43°, 30′, north latitude; its southern, 40°, 36′; its eastern and western boundaries are the two great rivers of the continent, on the east touching 90°, 30′, west from Greenwich, and extending to 96°, 30′, west. From north to south it is 200 miles; from east to west about 300 miles. It has an area of a little over 55,000 square miles, or of arable land over 35,000,000 acres. Originally it was a uniformly level sea bottom, gradually coming to the surface. In some great convulsion of nature it was elevated above the ocean, and inclined toward the southeast, favoring its drainage and exposure to the sun. Its highest part is near the northwest corner, where it is 1,700 feet above the sea; its prairie level at the southeast is about 600 feet. A slight fold or flexure gives a decline to the west of a small portion of the State; still, on a line drawn through

the middle of the State from east to west, the Missouri flows in a valley of erosion as deep as that of the Mississippi, but in a bed 425 feet higher. The underlying rocks are of two or three geologic ages, but of not a greatly varied composition. They were covered with a pretty uniformly deep layer of drift composed of argillaceous material. Then came a period of erosion, and the rivers formed plains and channels through the drift and



into the underlying rock in some places. There are evidences of a submergence and filling up of the old water courses, after which the rivers found their old channels again, or formed new ones, leaving the modified drift on their banks, or in their abandoned courses. The direction of the drainage follows the inclination. Two-thirds of the rivers of the State flow to the southeast, in nearly a parallel direction, and fall into the Mississippi.*

A line of elevation runs across the State, west of the Des

* This cut is used by permission of Mills & Co., publishers of White's Geology of Iowa.

Moines River, and nearly parallel with it, making a water-shed to the southwest toward the Missouri. There is, however, but little deviation from the general prairie level over the whole State. The river valleys vary in width, and in most places are bordered with abrupt banks or bluffs.

Over the drift is a thick layer of humus that has been accumulating for long ages. Along the banks of streams where the soil is thin and grass does not grow luxuriantly, trees are found; also they grew in isolated groups and in a scattered condition. Nothing like a continued forest exists, except in some of the river valleys, and these not very numerous.

The drift material came from a region to the north and northeast. It is composed of the disintegrated Devonian rocks, and of a cretaceous formation. This cretaceous stratum is in place, in a portion of the northwestern part of the State, and extends to the upper waters of the Missouri; its débris is found in a large portion of the soil of the State. From it is derived lime, magnesia, potash and soda; lime and magnesia in large quantities. These affect all the wells and springs found near the surface or in the drift. The sulphates and the chlorides of potash and soda appear in many places to a limited extent. At some remote period all the marshes and shallow lakes must have been strongly alkaline.

The soil of most of the western water-shed affords some striking peculiarities. It is homogeneous to a great depth and is denominated a lacustrian formation. At some time a deep valley existed which became a lake and was filled with sediment, the wash of all that great northwest which make the Missouri the "big muddy," and of which some observer remarks if it had been turned into Lake Superior would have filled it and all the chain of lakes with solid land.

It consists of clay, sand, lime and other alkalies and vegetable matter, and makes a fertile soil when thrown up from hundreds of feet below the surface.

Nearly all the water used for domestic purposes comes from shallow wells. Springs occasionally are found, and some of the larger towns are beginning to draw their supply from the rivers. Wells are yet the main dependence for farm-houses, towns and cities. They are from ten to fifty feet deep. The sub-soil holds the

necessary supply, and the ground-water is near the surface. All are contaminated with the salts of lime, and some with magnesia and the sulphates and chlorides of potash and soda. All the waters of rivers, lakes and springs are hard. This does not seem to be a source of ill-health, so far as yet observed. It sometimes temporarily affects new comers, but this is soon overcome.

It has been observed in European countries that the strongest conscripts come from the hard water districts. The deep layer of humus, and the organic material of the drift may contribute more objectionable elements to the potable waters. The ponds and streams, beside containing lime and other alkalies, are contaminated with organic matter more than cleanly kept wells. Settlement and cultivation add pollution to the streams and contamination to the wells; for the soil is not of a character to thoroughly filter out impurities; therefore, special precaution must be used. In some places wells are drilled into the underlying rock, but this is of a porous nature, and admits surface water; and is itself largely dissolved by the water that penetrates it.

Ground or surface water exists at a little depth over all the State; there being no season of great dryness that evaporates it, but often there are rainy seasons that keep the soil saturated all the year. In other words, the soil of all the country may be classed as a moderately damp one.

The cause of ague, or periodic fever, has in all ages been a fruitful source of discussion. Miasm, or malaria, a poison generated in certain soils by heat and moisture, entering the system to produce a specific result. Whether it is a poison that accumulates in the blood, or a multiplying bacteria, a bacillus, or a microgerm, is not essential to the present subject. The fact remains that some cause of special fever prevails over all the State. It arises in seasons of great heat and moisture, and is not confined to any locality, but affects all the State. Certain soils may be better for its development than others, and it may be denser in certain localities, yet owing to there being no ranges of hills or mountains, and no continuous forests, the winds equalize it over the whole land.

This general diffusion only happens at rare intervals, yet in every part of the State, in any season, few diseases occur that

do not manifest symptoms of this poison, and require antidotes that counteract it. Cultivation of the soil and general drainage may diminish or destroy it; they have not yet done so to any extent.

As our State is only a portion of the great plains, where like conditions exist, it will require more extended sanitation, beyond our borders, before the malady will be obviated, or cease to make its appearance among us.

Turning up the soil to the sun, drainage of surface and subsoil, and the growth of trees, are the remedies that are to be applied for its extinction.

The greater portion of the State was destitute of trees. They grew only in thin soils and along water-courses. The reason for this may have been in the early condition of the surface, covered with shallow water, often alkaline, then covered with grass and herbage that afforded material for annual (spring or autumn) fires. Trees grow in the upland prairie luxuriantly, when planted and protected, but when exposed to the fires that used to prevail, none took root, or if rooted did not survive. There are dry periods every year after vegetation has ripened, or been killed with frost, when a fire once started spreads far and wide. These dry periods may have been longer in past times, as there are evidences that the rainy belt is extending farther west at present. It is very conclusive to any one who has observed prairie fires that this is the reason the prairies were treeless.

Geologists are proving the existence of man even before the glacial or ice period. He was always a fire-using animal, and it is probable that for sport or by accident he started the annual burning that kept down the forests.

Notwithstanding the destruction of the timber found in the country when first settled, tree culture is becoming a part of agricultural work, and groves and ornamental trees meet the eye in every direction where once it was only a sea of grass. This must in time produce a beneficial change in the climate and health of the State. It is shown that destroying the forests of a country increases the severity of its climate, and contributes to its barrenness, so the cultivation of forests in a fruitful but treeless country must inprove the purity of the air, mitigate its heat and cold, and regulate its moisture.

The Mississippi River running along the eastern border has a valley or flood plain from two to eight miles in width. In the lower part of the State it is one hundred and fifty feet below the level of the prairie, increasing in the upper part to four hundred. The banks are abrupt, and in many places precipitous. If soil is afforded, they are covered with trees and a flora differing from the prairie; this is also true of the trees of the bottom. Some of the largest cities of the State are built in this valley and on the adjacent bluff. The temperature and rainfall is not appreciably different, but the force of certain winds is broken.

The soil of the plain is an alluvium resting on a drift-clay, this resting on the rock, which for the greater part of the river course is a soft magnesian limestone. The wells are dug in the clay or sunk into the porous rock.

Most of the other cities of the State are built in river valleys where nearly the same relations of humus, alluvial matter, clay and rock exist, except that on the rivers of the interior and the Missouri, the rock is at a great depth.

The larger cities are beginning to draw their water supplies from the river, but shallow wells are in a great part depended on, and will be for some time to come.

The valleys of the Mississippi and Missouri are subject to occasional overflows. This occurs in April, May, June or August; sometimes in September or October. These overflows are not regular but occur with intervals of from three to ten years. The period of high water usually lasts from five to ten days. No special disease or epidemic has been observed to follow these inundations. The rank vegetation of a fertile soil soon covers the ground in spring or summer after the water subsides, and absorbs the moisture; in autumn the frost destroys it.

The drainage of the river valleys is difficult; the cellars are uniformly damp, if not actually filled with water for the greater part of the year, owing to the proximity of the ground-water; this is true of the cellars in prairie towns and in farm-houses. It undoubtedly is a cause of disease, and especially may have to do with one that, though not very prevalent, is becoming much too frequent, consumption. From a limited observation it seems much more common than in the early history of the State. Dr. Bowditch, of Massachusetts, and

Buchanan of England, have proven the relation of consumption to ground-water or soil dampness. They have shown that consumption is greatly decreased in certain localities where efficient drainage has been introduced, and that "there is a certain connection with the frequency and mortality from phthisis and a damp soil." "Additional evidences," says a late writer on hygiene, "from different parts of the world has confirmed the conclusion that dampness of soil is an important cause of phthisis to the population living upon the soil."

Twenty years ago the writer settled in a city in the valley of the Mississippi, and in a radius of twenty miles never saw or heard of but one case of consumption for eight years. From that time until the present, cases have been known each year, until it has amounted to as many as ten, in some of the later years. This is believed to be true of other parts of the State. There has been no marked increase or decrease of other diseases in that time so far as observed.

Other factors are to be taken into account, such as difference in the modes of life, increase of population with hereditary tendency to the disease, advance in time of life—all are not sufficient to account for the increase in tubercular disease.

As a matter of limited experience in regard to soils, it has been observed that a tract of alluvial land is a locality of frequent malarial disease. The probable explanation is, that the same contains a large amount of organic matter, and that impurities that fall on the surface penetrate to some distance, the water flows away and leaves them, instead of being carried away by surface drainage, as on an impervious soil.

The prairies are nowhere entirely flat, but are in swells, like the waves of the sea. This leaves many depressions that hold water and make shallow ponds or "sloughs," that are permanently or temporarily filled with water. They contain the waters drained from the surface after rains or melting snow. In a few places there are ponds or small lakes of sparkling water, but most of them are susceptible of drainage, or dry up during the heat of the summer. They contain a large amount of organic matter, and are the source of miasm. They would be much more so if the coarse grass that springs up did not absorb it to a great extent. There are few marshes or sloughs in the State that are not susceptible of drainage, as they are not fed

by springs. The advance of settlement has brought most of these tracts into cultivation.

The climate of the State is modified by its position; a central portion of a great plain that has a gentle incline to the south, in the heart of the continent. The plateau extends from the eastern base of the Rocky Mountains—perhaps it would be better to say from the lower summit instead of the base; for if we pass west it is a gradual and almost imperceptible ascent until we attain 7,000 or 8,000 feet. The State at the southeast corner reaches near the lowest part of the plain, which then ascends to the east to the foot of the Alleghenies.

The isothermal line passes across the State diagonally, advancing to the northwest. It is in a measure protected from the storms of the Atlantic, and is far enough from the mountains that intercept the moisture from the Pacific to receive a due amount of precipitation. Its winters are usually mild; spring opens early enough for the planting and propagation of all the grains and fruits of the temperate zone; a hot month or two of summer follows, then the mild, hazy weather of autumn is sometimes prolonged until December. Moderate snows fall during the winter; the cold is seldom intense; the rainfall and moisture is pretty evenly distributed; general or long continued drouth is never experienced.

The moist wind comes from the northeast over the great lakes and up the valley of the St. Lawrence. The dry currents, or wind of precipitation, come from the northwest from a cooler latitude, and over the dry plains. Winds blow from other directions. A gusty, cold wind blows in winter, and springs from the northwest, that is denominated a blizzard. It is a very absorbing wind, and, aside from its discomfort, must purify the air and leave it healthful. Gales and tornadoes sometimes visit the State from the southwest.

Observations on meteorology have been made in various parts of the State for a series of years. A general uniformity of temperature prevails, local storms arise, and moisture is sometimes unequally distributed. The average temperature has varied less than a degree for a period of forty years from January to the end of December; in two or three localities the yearly average of three daily observations is 47½ degrees, not varying a degree in any year.

Frost comes the last days of September or the first weeks of October. Snow falls in November, the Mississippi freezes over the first of December, the coldest days are about the first week of January. Spring opens in March, hot weather commences in June and is most intense during July. A cool wave passes over the State the last days of August or first of September. The mild, hazy Indian-summer weather begins in October.

This may be called the average climate; in thirty years there have been a few exceptional seasons. Three times within that period the winters have begun in November, extreme cold occurring in January, with heavy falls of snow. For several days together the mercury has fallen to from 20° to 30° below zero. Two or three feet of snow has fallen and remained in drifts where the winds piled it until the middle of April.

On the other hand, in the same period have occurred winters in which very little snow fell, and the ground and the rivers were unfrozen in January, and spring opened by the first of March.

The mercury rises to 95° in July but seldom more than a degree or two above that. One of the oldest observers in the State makes the remark that he has never seen the mercury rise above 98° in the hottest day or fall below 36° below zero in the coldest. A cold winter is followed by a hot summer.

The rainfall is much more variable and modifies the heat of summer, and determines the prevalence of certain diseases. Rainy and snowy belts and local storms are sometimes observed. Dry, cold weather, except as a general depressing agent, is healthful; dry, hot weather is also sanitary; but when cold and dampness occur lung diseases prevail; when moist hot weather occurs in the after part of summer, malarial fevers and summer complaints of children are frequent or epidemic.

A cold winter, followed by a damp, cold March, happens in exceptional years, not as a rule, and there results a large mortality among aged people, and those predisposed to consumption. During three or four summers in twenty years, rain has fallen during the month of August, accompanied with hot weather. Malarial fevers have been epidemic, and the mortality among children very great.

This subject of meteorology is to be left to others, and the relation of climate to disease is to be determined when the board have obtained the necessary statistics.

Local causes will then be found as the origin of many diseases.

Geologically considered, the State rests on a formation of magnesian limestone. This is covered, for the most part conformably, with a drift deposit varying from two to three hundred feet, of an argillaceous character. It contains the remains of a formation similar to that on which it rests, and also of a cretaceous strata, and contains considerable vegetable matter. Over this is a deep layer of humus. The clay sub-soil contains a large amount of lime, and its salts affect the water found but a little way below the surface. The water for domestic purposes is hard, and sometimes contaminated with other salts than those of lime, and with organic matter. The proximity of the ground water makes the habitations damp. People become accustomed to the use of hard water, and it is not known to be the source of any disease. It is easily polluted, but that is an artificial result, and not to be considered here.

The dampness of soil may originate phthisis and aggravate other complaints. The organic matter of the superficial soil generates miasm. These are the most obvious points of the geology and the sanitary condition connected with it. Topographically, the country is part of a great plain in the interior of the continent, inclined to the southeast, equally exposed to the sun and wind. It has universally the same dampness when the moist current comes, and the same dryness when the dry winds blow, as there are no hills nor mountains nor forests to deviate storms or epidemics.

The rivers flow in valleys of erosion, many of them worn deep through the drift into the underlying rock.

The facilities for drainage are good, except in some of the river bottoms, where towns are located, there not being elevation sufficient to escape the flood tides. The climate is but little modified by the topography, being subjected mostly to influences beyond the State, it being part of the great intercontinental plain open from Hudson Bay to the Gulf of Mexico, bounded by the distant mountains along the Atlantic on the

east, and the far off Rocky Mountains on the west. Its central position gives it a medium climate, favorable for fruits and grains of the latitude, and also favorable for health and longevity.

CHEMISTRY, IN ITS RELATIONS TO DOMESTIC LIFE.*

By PROF. R. C. KEDZIE, M.D., of Lansing, Mich.

Chemistry is a practical science, and every day we learn of some new principle, which it applies to manufactures or the arts. It is with extreme slowness that it is applied to domestic life. But people are aiming now to reduce everything to principle, so as to not only do a thing right, but to know why it is right. In the life of our homes there is no science which can be more useful. Supposing ourselves to be a favored guest, invited to "go around and see the house," we will saunter through an imaginary mansion, out into the dining-room, prowl through the kitchen, investigate the cellar, peer into the pantry, look at the drain, taste the well-water, examine the soap-kettle, and make free with an ideal domestic establishment. In the kitchen there is the smell of cooking coming from the oven. There is a roast of beef there. The fire is not hot enough and there is no water in the basin. The fire should be hot to close the pores of the meat so it will retain its juices, and to do this without burning the outside there must be water in the basin to keep the heat from being too high and still make it a muggy day for the roast beef. Dredge flour on, too, to help seal things up.

Here is the bread by the stove ready for the oven. Every loaf of bread is the result of a brewery in which the manufacture and use of alcohol will go on, spite of prohibitory laws. The yeast plant causes fermentation in the dough, which converts the starch of the flour into sugar, and that in its turn into alcohol and carbonic acid. Then it is ready for the oven. Carbonic acid gas is the thing sought for in all this process of setting the sponge, kneading and keeping the dough warm.

* Abstract of paper read before Sanitary Convention, at Ionia, Mich., December 14, 1883.—*From Ionia Sentinel.*

Two principal constituents in flour are gluten and starch. Pure gluten is dark and tough like glue. Its office is to retain the bubbles of gas to make the bread light and porous. If the mill-stones in grinding are set too tight it causes heat that destroys the tenacious property of the gluten. The flour is then dead—will not rise. If we wait too long before putting the dough in the oven, the acid does not wait, but goes right on and makes acetic acid, and the bread is sour. The reason baking powder does not make as good bread as is made by this process, is, that it cannot be mixed with the flour as thoroughly as nature does the work, and the gas is liberated too quickly. As soon as the mixture is moistened the carbonic acid gas is liberated, and much of it escapes. In the process by fermentation, the conversion of the starch goes on successively. Baking powder is made of cream tartar, bicarb. of soda and rice flour. If the ingredients are all strictly pure, the following formula will be correct: Thirty-one parts of soda, 69 parts cream tartar; 10 parts rice flour. But these articles as sold at drug stores are not always pure. An analysis is generally necessary to determine how much weaker they are than the pure article. Buy baking powder of responsible dealers and of a well-known brand. Never take chances in tea-sets if you want a good article.

Too much soda is generally used. One small teaspoonful of it to the quart of flour, if it is skillfully neutralized with cream tartar or sour milk, will be enough. Plunging the soda into sour milk and then stirring in the cup for five minutes before putting it in the flour, as is often done, causes about half of the carbonic acid gas to escape, thus losing the very thing that the soda is used to produce.

The only thing to do to preserve fruits or other foods is to keep them away from those little atoms called *bacteria*. They are little, but mighty in numbers and influence. Anything that will destroy *bacteria* will preserve food. A piece of beef treated to the fumes of burning sulphur will keep two weeks longer than one not so treated.

The lumps in jelly are glucose. This is made when acid fruit is boiled with sugar. The lumps when washed are found to be like the sugar found on the exterior of good raisins, and hence called "grape sugar" or "glucose." It is only two-fifths as sweet as the original sugar. The waste caused by its

manufacture may be avoided by adding the sugar to the juice when the cooking process is about completed, and the juice ready to remove from the fire.

The piece of paper put on top of the jelly cup does not prevent mould, but a lump of paraffine dropped in the tumbler while it is still hot enough to melt the paraffine and form a film over the top will prevent it. This is a very useful and cleanly article.

Fruit that will not jelly is too ripe. Just ripening it contains a substance called *pectose*, which, when heated, will solidify on cooling. If the fruit goes on ripening the *pectose* is changed to *pectin*, which will not make jelly. Fruit for jelly must not, then, be "dead ripe," but just approaching ripeness.

The chemical process by which grease and lye are converted into soap was explained, and also the tests for detecting glucose in sugar were given.

Butter gets "strong" when *bacteria* gets to work at it, and protection from them keeps it sweet. This may be done by excluding it from the air in which the *bacteria* float. Sealing the butter in tight jars or immersing it in strong brine will do it. Salt on the top of butter will not protect it; brine around it will.

Butyric acid, which means strong butter, is never found, except where the butter is exposed to some ferment, and this ferment is caused by *bacteria* germs, coming always from the atmosphere.

VIENNESE BREAD, says *Notes and Queries*, is celebrated. It may interest you to know something about it. The excellence of the bread is attributed in Vienna to three reasons—the oven, the men and the yeast. I think another may be added, and that is the dry climate. An ounce of yeast (three decigrammes) and as much salt is taken for every gallon (one litre) of milk used for the dough. The yeast is a Viennese specialty, known as the "St. Marxner Presheffe," and its composition is a secret. It keeps two days in summer, and a little longer in winter. The ovens are heated by wood fires lit inside them during four hours; the ashes are then raked out and the oven is carefully wiped with wisps of damp straw. On the vapor thus generated, as well as that produced by the baking of the dough, lies the whole art of the browning, and the success of the "semmel."

VENTILATION.*

By J. H. KELLOGG, M.D., of Battle Creek, Mich.

Dr. Kellogg's address was long, but he showed such practical familiarity with the subject as to command close attention throughout. The special points made were:

(1) We need pure air in our houses to dilute or wash away the impure matters which we are constantly throwing off from skin and lungs. With every expiration we breathe from our lungs a cubic inch of carbonic acid, which acts as a poison if re-breathed, and we also throw off at each breath a smaller quantity of worn-out organic matter, which, if re-breathed, is *much more poisonous*, and often produces or helps along grave diseases, especially consumption. There must be a constant change of the air in our rooms to dilute, wash away and get rid of this impure air and to bring in pure air in place of it.

(2) It is fallacious to suppose that one or even two openings into a room from the out-door air are enough to carry away the foul air, and to secure good ventilation, or that a ventilating shaft without heat will carry off the foul air.

The lecturer demonstrated this by experiments.

(3) In order to carry away the foul air from a room, we must have a heated shaft opening into the outer air above, and opening into the room below at the floor. So long as this shaft is kept heated there will be a constant flow of foul air outward into the open air. If not heated there will be no constant outward flow of the impure air, such as is necessary to secure good ventilation. Each room should have a separate shaft.

(4) To secure pure air to take the place of the impure air withdrawn by the heated shafts, we may either bring in unwarmed air directly from without, or very much better, we may bring in out-door air over the heated surface of radiators, or over stoves. (Diagrams illustrating simple ways of doing this were shown). In the latter ways injurious drafts are avoided and the air is properly warmed before it reaches our lungs.

A lively discussion followed by Drs. Thomas, Romig, Gamlier, Hazelwood and Marshall, who expressed widely different views—showing but little practical knowledge.

*Abstract of address before Sanitary Convention at Ionia, Mich., Dec. 13, 1883. *From Ionia Sentinel.*

THIRTY YEARS OF SANITARY PROGRESS IN THE NAVY—ITS PRESENT NEEDS.

The Annual Address before the Naval Medical Society at the Museum of Hygiene, Washington, D. C., January 3, 1884, by the President, ALBERT L. GIHON, A.M., M.D., Medical Director U. S. Navy; President of the American Public Health Association; Vice-President of the American Academy of Medicine; Vice-President of the American Medical Association, etc.*

Names have been responsible for much of the error in human thought and understanding. In the progress of knowledge, a name often retains its early significance, and conveys a false impression of that of which it should be an accurate index, the misrepresentation becoming the nucleus of false ideas and unsound theories.

Of all misnomers, none is more responsible for a long train of fallacious deductions than that of *surgeon* as the generic designation of the medical officers of the navy. In the popular mind the term surgeon denotes a man (never a woman) who effects the mutilation of the body by knife or other instrument of torture, and, incidentally, *assistant surgeon* is the one who assists him in his cutting, tearing, burning, twisting, or other mechanical maiming procedure. The intelligent American has come to credit the professional surgeon with the ability to treat his patients medicinally as well as mechanically, but conservative Englishmen, who still cherish their "Ushers of the Black Rod" and "Gentlemen of the Bed-Chamber," and the fiction of living, moving and having their being by Her Majesty's gracious will and pleasure, divide the practitioners of the healing art into surgeons, physicians, and apothecaries or genaral practitioners, between whom the lines are as defined and impassable as between the barber-chirurgeon, who was the operator's prototype, and the leech who dispensed salts and castor-oil In this country subdivision of another kind has run riot, based not on admitted grades of position and precedence, but on the special regions of the body to which the curer devotes himself. The oculist and the aurist, the laryngologist and the gynecologist are specialists in practice, but they are peers in the realm of medicine, which is even broad enough to include dentists,

* From advance sheets of the *United Service Magazine*, March, 1884.

veterinary surgeons, chiropodists, manicures and allopaths, but still frowns on the infinitesimal doser and he who cries "Allah il Allah! Similia similibus curantur."

Broad as is this realm, even to educated people it is a *terra incognita*. As the term medicine denotes something to be swallowed that will sweat or purge, or in some other way act upon the animal economy, so the medicine-man, the physician, the physicker, is regarded solely as the administrator of the pills and powders and potions in which the drug is compounded. Hence the prescription paper, like the surgeon's pocket-case, is the indispensable badge of his office, and the fee is not considered earned without the cabalistic-covered paper in the one case or the lint and bandage and sticking-plaster, where the knife has not drawn blood, in the other. He is a bold man, and not mindful of the dollars he risks, who dares to say to his patient, "You suffer because you have sinned against the laws of health, and done the things you ought not to have done. Go, sin no more if you would be well."

The Greek *μεδέω* like its Latin derivative *medeor*, meant *to care for*, but since the idea of cure has been substituted for it, it seems impossible to induce any wider comprehension of the true mission of the physician. Only those who have studied devoutly the great mystery of Life, and stood in the presence of that other mystery, Death, realize that the science of medicine is the grandest, the sublimest, and the most profound occupation of human intelligence. The intricate processes of life, whose harmonious workings constitute health, the source of happiness, whose disturbances bring disease and its attendants, suffering, and sorrow and sin, unfold themselves to the physician, and his is the master-hand who so guides the wondrous mechanism that no part jars. It may be the same skill which relieves the peasant's aching joints, which interferes to save the life of one of the world's heroes, or counsels how whole peoples may be spared from decimation, or the duration of a generation may be prolonged. The potent drug which has worked the miracle upon the agonized sufferer and gains renown for the prescriber may be the most trivial application of that knowledge of man and his mysterious vital phenomena: and, unfortunately, the *vox populi* exalts the thaumaturgist, and depreciates or is deaf to the teacher.

Even more than in civil life has the naval surgeon's title been a clog to his proper office. Looked upon primarily and chiefly as a mender of broken bones and knight of the bloody scalpel, incidentally as a make-shift physician, supposed to know enough of this higher art to dose with rude draughts of nauseous drugs the rough denizens of the sea, but all unskilled to minister to the ailments of gentle woman or tender child, he has had to perform his thankless office in the face of obstacles when he should have found assistance, misrepresented and maligned when he should have been encouraged and lauded. If he has only been tolerated as a technical doctor, he has been spurned as a sanitarian. His tirades about wet decks and mephitic atmospheres, his preaching of dryness and cleanliness and ventilation were (and understand that, while I am now speaking in the past tense, the time was present in my own generation) contemptuously ignored. His opinions were never solicited, and, when impelled by his own sense of duty to tender advice, it was more often rejected than followed.

At this day it may, therefore, be profitable as well as encouraging to those who are to succeed us in the arena, to review what the medical corps of the navy has accomplished in the cause of naval hygiene, which is the most important and responsible of its charges. As, among enlightened people, the physician has now come to be regarded as the health-adviser of families and communities, the medical officer of the navy has successfully asserted his right and his duty to be the sanitary guide and authority in the naval establishment. To keep his fellow-beings well is admitted to be paramount to healing them after they have been allowed to get sick—to exclude the feeble and invalid from the force of the service, to ward off the causes of disease, to maintain a strong, active and effective *personnel*, are at last regarded as wiser and more desirable and creditable than to have hospitals full of men needlessly sick. A small percentage of mortality among a large sick-list is less evidence of professional success and skill than rows of untenanted beds in the hospital wards, an empty sick-bay, or a binnacle-list of two or three cases of broken bones or acute phlegmasiæ. So long as medical officers themselves tacitly acquiesced in the assumption that pills and suppositories were their potent weapons, which any corner apothecary could wield as effectually against

constipated bowels and bloody fluxes, they had only themselves to blame if their office was looked upon as scarcely more dignified than that of the ship's tailor or the "jack of the dust." This was in Tom Bowling's day, when scurvy and the pox were as common as oaths, blackguardism and despotism in both forecastle and gun-room; but I remember, during my own novitiate, when a doctor was apt to be sharply reminded that his legitimate office was over when he had seen his sick and signed his day's report.

If the medical officer of the present day has been criticised for forming too exalted an estimate of the responsibilities of his corps, it has only been by those who have themselves failed to properly pppreciate the higher functions of their own offices. The line-officer, who looks upon the manipulation of sails and spars, which any whaler can do as well, or who regards the manual exercise of great guns, which any quarter-gunner knows all about, as the chief requirements of his calling, is incapable of those higher efforts of the mind which make the intelligent commander, the scientific investigator, the brilliant strategist. The sailor, the gunner, the engine-driver, are the bone and sinew of the naval organism; the skilled architect and engineer who calls its frame and internal mechanism into being, the scientific ordnance officer and the enlightened navigator who control its motions and powers, the educated physician and sanitarian who carefully watches and guards from injury that intricate and delicate machinery, not made with hands, which animates and impels the whole—these are its brains and nervous system.

Among these brain-workers I claim a pre-eminent place for the men whose lives are devoted to the pursuit of that profound science which involves the study of all that is grand and sublime in nature—which concerns itself about man's place in the universe, his origin, his existence, and his destiny—which aims to banish disease and suffering from the earth, prolong life, develop the race, and thus increase the total of human happiness and enjoyment. The relief of a sailor's crippled limb, the cure of a suffering officer, the defense of a ship's company from possible disease, the development of the physical efficiency of the naval force to its highest possible degree, and the consequent successful attainment of its undertakings—these

are all legitimate outcomes of the study of complex organisms through long stages of evolution and of mysterious vital phenomena requiring diligent application, profound research, and the highest efforts of the reasoning powers. These are high responsibilities, and it is but right I should show by a retrospect of my own experience that we have not been unfaithful to them.

In a sanitary point of view the navy of to-day is more widely separated from that of thirty years ago than was this from the service a hundred years before. Of the ignorance and brutality, the degradation and disease, of that time, Surgeon's Mate Roderick Random has left us vivid pictures. The riffraff of sailors' slums were huddled together, ragged and besotted, on "guardos," whence they were driven like cattle on board a seagoing ship, where they were imprisoned with jealous care, filthily fed, wretchedly clad, crowded like beasts in a pen, and subjected to the harsh treatment of foul-mouthed masters, who scourged them at the will of coarse despots like Captain Trunnion, or brutal blackguards like Captain Oakum, or sickly aristocrats like Captain Whiffle. The traditions of our own service tell of Trunnions, who defied law, practiced cruelty, and outraged decency, but happily the refining influences of education have almost banished them from the naval literature which records our history.

That we may better understand the enormous progress of the last third of a century, and silence the repiners over the fading glories of the old navy, let an eye-witness review the sanitary condition of an American man-of-war in 1855, with its lesser vulgarity, obscenity and profanity, and its then already great improvement in the conditions and associations of the officers.

The ship I have selected as typifying the navy of that era sailed from New York in the winter for a three years' cruise in the China Sea. She was manned by a motley crew, of whom Americans were a minority, and Englishmen, Irishmen, Northmen and "Dagos" constituted the far greater part. Some had just returned from another cruise, having squandered or been robbed of their three years' pay by the landsharks, who cajoled them only half sober to the rendezvous to be re-shipped, and thence to be herded, uncared for, on the receiving-ship, still popularly termed the "guardo," until drafted on board the

first sea-going vessel. All were in debt, most of them insufficiently clad and unable to properly outfit themselves. The vessel itself was one of the larger sailing sloops-of-war (there were not ten vessels in all then deserving the name of steamers), and she had a reputation for nautical beauty and sailing qualities. There was no pretense of ventilation, except by six-inch air-ports, which were closed with "all hands up anchor," wind-sails, which were of no use in calm weather and could not be set if it blew, and hatchways housed over when it rained. In the dim mephitic twilight of the berth-deck the crew huddled together in bad weather, and at night they swung, when both watches were below, in one seething, sweltering, fetid human mass. Only they who have gone upon an old-time berth-deck towards the close of the midwatch can realize the horrible filth-polluted atmosphere which was then breathed by human beings, fouled by human emanations, fouled by the bilge-vents that poured the noxious vapors of the holds and limbers upon the deck, fouled by the damp, unwashed clothing in which men lived week after week, fouled by the heavy moisture of the decks daily deluged in the name of cleanliness.

The wretched herd, who were thus gathered from the purlieus of Water Street and North Street and South Street, who at night were kenneled worse than dogs, by day fed like them, crouching on their haunches around greasy mess-cloths, cutting with jack-knives or pulling to pieces with grimy fingers the chunks of "salt-horse" and "duff," which made their daily fare, and which later in the cruise were both spoiled and scanty. During long passages, when officers' messes were reduced to the navy ration—canned and hermetically sealed supplies being then rare and expensive—they shared with the crew the ship's bread, in which it was a pastime to wager the number of weevils and worms per square inch; salt beef, which was termed *horse* from its fibre, and *mahogany* from its density and color; pork, softer in texture and green from putrefaction; rice, which was mouldy; and beans, which either could not be boiled soft, or which had surrendered their starchy contents to feed and house the myriad insects which peopled them. If wood and water lasted, these could be cooked, but often there was neither enough of the one nor of the other to allow more than one cooked meal a day. Understand, I am reading from leaves of my own experience—

an experience of an allowance of a quart of water a day for cooking, drinking and washing, and that which sometimes had to be strained through closed teeth, with eyes shut and nose held—an experience which made pickles and molasses luxuries, and "swanky" a very nectar.

Stint of good food was not, however, the chief of the old-time shell-back's ocean trials. Fed like a brute, housed worse than one, however faithfully his labors were performed, there was for him only a long, dreary season of imprisonment. For him there was no glad holiday on shore when the land broke the monotony of the waste of waters. The officers might rush pell-mell out of the ship, but Jack could only strain his longing eyes upon the green fields or busy seaports, or find companionship with the bumboat and washerwomen and petty traders who came alongside to fleece him. The license during the preceding generation for these Jills to come on board during the cover of the night and flit away with the dawn, with all its flagrant immorality, lacked the Tantalian cruelty of this sight of the cup that could not be tasted. Notwithstanding the hardships of the voyage, the wretched food, and the outbreaks of disease, the crew were confined *eight months* on board ship before "general liberty" was given, and then men and boys were sent on shore forty-eight hours to indulge in a mad revel, and to return crazed by rum, battered and bruised; or if unable to return, to be picked up by the pimps and policemen, who had detained and concealed them, waiting for the reward sure to be offered for their apprehension, and which was deducted from their scant wages, keeping them in debt for other months before the same vile rout, miscalled "liberty," could be repeated. The poor wretch, first made ravenously hungry for dissipation by his enforced confinement, was then expected to be temperate in the feast of indulgence offered him, and punished with vindictiveness if he sought to gorge himself with the poor semblance of pleasure. The cat had been abolished, but half-a-dozen boys strung upon the poop "bucked and gagged;" half-a-dozen men triced up by their thumbs in the rigging; each of the upright coffin-like "sweat-boxes," with its semi-asphyxiated inmate; the "brig" with its bruised and bloated crew in irons; the main hold with its contingent under hatches; the sick-list swollen out of all proportion by inebri-

ates, injured men and venereal cases—these were the fruits of the general liberty which, within my professional life, represented the sum of sanitary interest in the man before the mast.

The retrospect is saddening. In the light of the present day the dirt, disease and degradation of thirty years ago are incredible. The comfortably quartered steerage officer cannot realize that there were men older in years and longer in service, bearded and stalwart fathers, who passed years in the dim, dismal, roach-ridden recesses of a frigate's orlop, where air only entered by a wind-sail, and besides the glimmer of day through the one small hatch down past three or four decks, there was no other light than that from a dull yellow tallow candle gasping for oxygen. Occasionally a yeoman's store-room in the fore-peak, with air now believed too foul for its one occasional occupant, gives an idea of what it was when six or more lived in as small a hole and nurtured the seeds of diseases to take them away from the sight of man. There were drunkards in those days among officers, as there were pederasts among the crew, because nature's normal needs were denied, and found vent in distorted appetites.

As though the stint of light and air due to the defective architecture of the ship were not enemies enough to human health, a third was added more potent for evil than all the others together—water; not the broad water on whose bosom they floated with comparatively little risk, but the invisible ocean of moisture with which man in heedless ignorance saturated the air by deluging the decks, in the vain effort to make them clean by adding the one essential of filth.

Bad food, foul air, and moisture were the trinity of evil spirits which wrought more havoc to the efficiency of the navy, by honey-combing and undermining the bone and sinew of its *personnel*, than all other causes combined. Under these influences I became in the first year of my first cruise a sanitarian. To seek to ameliorate these evils I then determined to make the effort of my life. From that day I have preached a crusade, with all the strength given me, against a system that would deliberately mar and impair that most intricate, most wonderful, most beautiful of all the mechanisms which operate a navy—that one which of all others must be perfect in its parts that its work may be well done. If to-day there

are dry decks, and ventilated decks, and decks flooded with light, what has brought about the change but a deference to those sanitary laws that are as immutable as the laws of attraction and repulsion ?

I have pictured one vessel I saw nearly thirty years ago, which, through the total disregard of every sanitary precaution during a cruise of thirty months, seldom had less than twenty of her two hundred officers and men upon the sick-list (averaging during whole quarters of the year, thirty-two, thirty-three, and thirty-five a day); twenty-eight deaths, and Heaven only knows how many irreparably wrecked among the invalided and deserted and discharged, who left the service to be heard of no more. As an example of bad sanitation, which occurred in 1855–56, but which is impossible at this day, permit me to quote from a little volume of my own.*

"After a long and stormy passage through the Indian Ocean, the 'Levant' arrived at Anjer Roads in Java on the 25th of March, 1856, when the heat was intense. Her crew were enfeebled, and many of them exhibited evidences of the scorbutic cachexia, in consequence of the deteriorated and unsuitable character of their food, which the insufficient daily issue of wood did not allow to be properly cooked; of their short allowance of water, which was impure; of their confinement on board ship since the previous October, when she went into commission; and of their unusually arduous labors in the high southern latitudes, where they were exposed for several weeks to a continuance of cold, damp, and rainy weather. Notwithstanding their condition they were laboriously employed, working from daylight until dark for two days, getting on board wood which was wet and green, and water white from organic impurities, and which had run through a series of dirty wooden troughs into an equally dirty reservoir. The vessel sailed on the evening of the third day, and within a few hours that night twenty-four cases of *cholera communis* were reported, two of the lieutenants among the number. Few of these men were ever able afterwards to do their duty properly. As events proved, this was their preparation for a tedious passage of *forty-six days* across the China Sea to Hong-Kong, a distance

* "Practical Suggestions in Naval Hygiene," by Albert L. Gihon, A.M., M.D., Medical Inspector U.S.N., Washington, 1873 (third edition), pp. 110–112.

of only twelve hundred miles, but entirely within the tropics (latitude 8° south to 20° north), at the season of the change of monsoons, when the high temperature is not moderated by any breeze nor the scorching heat of the tropical sun scarcely ever shielded by a clouded sky, and when the glassy surface of the sea reflects and concentrates the heat upon the ship, whose black sides greedily absorb it. The deck-load of freshly cut green wood added an unwholesome moisture to the atmosphere, and the unfiltered water with which the tanks had been filled, preferred for cheapness, soon decomposed and became offensive and unpalatable. The men had gorged themselves with oranges, mangosteens, and other fruit during their short stay at Anjer; but the supply of chickens, vegetables, and fruit which they brought away with them was soon exhausted, and they were again fed with the mahogany-like 'salt-horse,' green fat pork, worm-eaten bread, weeviled beans, and musty rice, which they had had to eat in the chilly regions of the Southern Ocean. The paltry interval of three days in ninety-seven had brought no relief to their jaded and debilitated bodies; but they were occupied with the still severer labor of working ship for every 'cat's paw' under the additional morbific influence of a vertical tropical sun. Most of the intractable cases of diarrhœa and dysentery, and the large majority of deaths during the cruise, can be directly traced to this period. The asthenic habit of constitution which rendered these complaints fatal was evidently fixed upon them by the various concurrent circumstances in operation thus early in the cruise. After her arrival on the station, this vessel did not, like the rest of the squadron, employ a Chinese 'fast-boat,' and the results of this and other violations of hygienic mandates were plainly shown in a sick-list of *thirteen hundred and forty-five* cases during the thirty months of her commission. Nor was the sickness and inefficiency of the crew the only consequence of this utter disregard of sanitary laws. One of the officers who inspected her at the end of her cruise told me that she was the most unclean and ill-conditioned vessel he had ever seen."

As a companion picture, I shall briefly call your attention to a man-of-war I have just officially visited, as a member of the Board of Inspection, on her return from a three years' cruise, part of the time on the coast of Africa, there having

been during the thirty-six months among her two hundred and twenty men and officers but a single death from disease, an average daily sick-list of only 4.22, including trivialities that formerly were not reported, and only twelve men invalided, five of these having been sent out of the ship before she left the United States. Her berth-deck, bright with light from large rectangular ports, was clean and dry, having been covered with shellac, and easily and speedily cleansed. Her comfortably-clothed men were well fed with substantial and abundant food, which they ate decently, sitting on benches at clean tables. Her prison-brig was clean from mere disuse, though its very cleanliness were enough to tempt a skulker.

Satisfactory as was the "Galena's" condition, another vessel, the "Trenton," which I inspected a few weeks later, at the beginning of her cruise, represents still further progress in sanitary prevision. Here ventilation by aspiration has been provided for, tubes communicating with every apartment and store-room and *cul-de-sac*, from which vitiated air is drawn to be discharged in the open air of the spar-deck, with the successful practical result that, notwithstanding the necessarily crowded condition of the berth-deck at the close of the first watch, all but a quarter-watch being below, not a trace of animal odor was perceptible to the senses. Illumination was obtained by day by large unobstructed ports, and by night by electric lights, which were placed in every apartment, store-room, and passage-way. Where there are light and fresh air and dryness at the outset of a cruise, there will be neither dirt nor vermin nor disease at its close, and the effort to exclude moisture on board this ship is not confined to shellacking the berth-deck, but a capital steam drying-room has been placed at the heel of the bowsprit, where men's clothing, damp towels, and other wet fabrics are at once dried.

Latrines and bath and wash-rooms under the top-gallant forecastle, mess-tables and benches, mess-lockers and clothes-lockers, a place where and opportunities when men can read and write, and frequent daily liberty to go on shore, if not already common to every vessel, are yet now so generally the concomitants of the well-officered and well-disciplined and efficient ship, that ere long their absence will be accounted a fault.

The naval sanitarian to-day has a comparatively easy task. He has no longer to preach to unwilling ears, but rather to see that he is not outstripped by his shipmates of other corps. The bulky volume of naval hygiene, with its chapters of horrors, is shrinking to a little pocket memorandum-book. Executive officers themselves point with pride to the shellacked decks. It was a line colleague on the Board of Inspection, Admiral Rhind, who strenuously insisted upon a wash-room for the crew, and Captain Harmony has devised a most admirable removable canvas-bath for them. A practical seaman, Commander Howison, has been the most persistent advocate of benches and tables at which the man before the mast can sit and eat, without danger of becoming less a sailor; and another commanding officer, Greer, whose nautical reputation is beyond question, demonstrated the practicability of daily liberty-lists. If I began my career, always in arms, contending for the right, and grudgingly gaining a little of it, I have just ended my duty on the Board of Inspection with colleagues who never once, during all the years of our association, antagonized a suggestion having a sanitary object, but more than once themselves advanced them, and I gladly take this occasion to bear testimony to their zealous co-operation. It is true there are still men who profess to believe in holy-stoning a deck rather than in shellacking it; there are some who would send the mess-tables and benches on shore and restore the greasy mess-cloth; as there are some whose daily list of punishments has more names upon it than the daily list of liberty men, if indeed there be any such.

Only a few days since, coming from the clean, bright, beautiful berth-deck of the "Trenton," we happened to go on board another vessel on which clumsy mess-chests encumbered the berth-deck, where the crew were squatting on their haunches around black mess-cloths, in the dim light which came through the old-fashioned six-inch air-port. The contrast was marked, and Commodore DeKrafft, the president of the board, turned to me and said, "This carries me back thirty years." And still later we saw on board another vessel, fortunately soon to be abandoned, the abominable perforated iron plates, which used to be placed the whole length of the berth-deck, opening into the frame-spaces, and permitting the emanations of the

hold and bilges to find vent under the hammocks of the men and beneath the bunks in the state-rooms of the officers.

Sanitary defects look us in the face at every corner, even on shore; therefore it is not strange that we still encounter them on board ship, where sanitary perfection is necessarily unattainable. It is at best an unnatural existence for several hundred individuals of one sex to be cooped within the confined limits of a vessel, which, to float safely, must have every aperture by which water can enter tightly sealed—restricted in their movements like caged animals—for weeks, where the eye is not solaced by the sight of green trees or brown earth, and dull monotony paralyzes the brain, which has no stimulus of variety to enliven and divert.

But there are things which are possible. The fourth-rate has the same need for a ventilating apparatus as the first, and it is as irrational to deny the one and grant the other as it was to supply a brig with one chronometer, a sloop with two or three, and a frigate with four, or to detail a chaplain to save the souls on board a flag-ship and leave all the rest of the fleet to their unobstructed eternal damnation. Every vessel in the navy, large and small, can have its aspirating apparatus and its twenty-inch Wilson air-ports, its latrines and wash-rooms under the forecastle, and its canvas bathing-box on the spar-deck for all the crew, its shellacked berth-deck and its steam drying-room, its mess tables and benches, with enameled pots and mugs and plates and dishes, and knives and forks and spoons for table furniture, its removable mess-lockers suspended between the knees overhead with open wire fronts exhibiting their contents, its portable clothes-lockers neatly arranged, accessible and securely locked, its reading and writing place and facilities at designated times for the men, and its daily liberty-list in port. It can have its limitless supply of pure condensed water, cooled and aerated before it goes into the tanks. It can have ice for the sick, of whom it ought to have but few, and good wholesome food, and that food well and properly cooked; and this leads me to the one point in naval hygiene that now demands our earnest attention.

The naval ration is varied, nutritious, and sufficient, provided advantage is taken of the frequent stays in port, for the substitution of fresh bread, vegetables and meat, and

improved galleys have been devised which leave little to be desired; but the method of cooking and the system of messing remain unchanged from the fashion of the past. The ship's cook seeks the office for its emoluments, and is selected without any special examination as to his culinary skill, and the men themselves, however inexperienced, careless or untidy, perform in rotation the duties of mess-cooks, or more correctly, attendants of the messes, into which the ship's company is divided. The system is crude, clumsy and objectionable. Those men who become best suited for the duty are unfitted for their legitimate military work. On board a vessel of war everything should contribute to its greatest efficiency as a military machine. Simplicity should characterize its organization, all parts of which should work without friction. Hence the multiplicity of messes, of officers as well as of men, adds unnecessarily to the servant class, whose mere presence encroaches upon the air-space and sleeping accommodations, and whose want of military skill makes them incumbrances instead of aids. Thus, there are the commander-in-chief's mess, the commanding officer's mess, the wardroom mess, and once there were two independent wardroom messes, the starboard steerage mess, the port steerage mess, and the warrant officers' mess, each with a cook, a steward and servants, each occupying the galley at different hours or requiring extra galleys, each with its unnecessary and absurd multiplication of storerooms and pantries and mess paraphernalia, which, however well arranged and cared for, are, from their very nature, foci of uncleanness. As the man-of-war's man is but a soldier afloat, and the naval establishment is built upon the military model, ranks, grades, and duties differing in name but assimilated in character, it is advisable when defects are recognized in the former to inquire whether they exist in the military prototype, and if not, to ascertain whether there is any reason why they should be unlike. The ship is the analogue of the regiment, and the captain of the former the parallel of the colonel of the latter in dignity, duty, and responsibility. Hence, as the colonel presides at the regimental mess and admirals are entertained there without abasement of their personal and official consequence, though meeting the cornets and subalterns, who are that colonel's messmates, the argument fails that on board

ship the dignity which doth hedge in a king requires the commander to eat and drink in worse than regal solitude. As one whose sea-going days are past, and who can therefore speak disinterestedly, I beg to urge the necessity for a reform in this matter, confident that another thirty years will not have passed before there will be established one general mess, at which all officers will assemble, and at which it would be derogatory to the navy to assume there would be improper license of speech or act, but where, on the contrary, the younger officers would ever have before them in their seniors the example of the demeanor which characterizes him who is both officer and gentleman. The gain in military efficiency will compensate the government for contributing its share for official entertaining, which, after all, is legitimately its charge, while the cabin outfits now supplied will need little if any increase, thus removing the objection that the cost of such a mess will be beyond the juniors' means. In fact, steerage messes under the improvident management of young and inexperienced caterers are but little less expensive than a well-regulated wardroom mess. The other objection, that only the commanding officer entertains official guests, is less tenable, since it is the custom for wardroom officers to contribute to all extensive entertainments, and one or more of these officers are usually invited to be present at smaller affairs, while the example of the foreign officials who are ordinarily those to be entertained is directly to the contrary. Furthermore, no sacrifice of the privacy of the commanding officer is contemplated, and at other than meal hours he can isolate himself within his own apartments. One competent steward, one cook, and a smaller number of trained servants will suffice for such a mess, and the military force of the vessel be more than proportionally increased, since there will be not only a direct gain of the fighting element, but the additional indirect gain from the absence of an equal number of non-militants.

The consolidation of the officers' messes naturally involves the discontinuance of the assignment of warrant officers to sea-going vessels. Practically the propriety of this step has already been recognized by the Department. The gunner's functions properly pertain to a commissioned ordnance officer, and the superintendence of the strictly nautical duties of the

boatswain belongs of right to any educated line-officer, while the mechanical work of the carpenter and sailmaker is more often, even now, discharged by a chief mate than by the warranted officer, who occupies at best but an anomalous position on board ship. The very able and worthy men who now bear warrants can serve the government effectively at the navy-yards, while the sanitary gain of space now required for the state-rooms, mess-rooms, pantry and store-room, assigned them on board ship will more than counterbalance the inconvenience from the occasional losss of their services. Commensurate with the increased responsibilities of the mates, who will supply their places, greater official consideration should be shown them and the other artisans who are required to possess like mechanical skill and proficiency, until a recognized class before the mast is established similar to the non-commissioned staff of the army and marine corps.

At the same time there should be a radical reform in the system of messing the ship's company, who should be subsisted as are the passengers and crews of merchant steamers—a steward, a cook, and a limited number of attendants employed on this exclusive duty, a single pantry adjoining the galley, and a gratuitous outfit of porcelain or enameled ware, supplanting the twenty or more mess-cooks, and clearing the berth-deck of its panoply of mess-chests or mess-lockers, with their clattering tin pots and pans.

To insure a competent class of cooks, all such employes should undergo, after enlistment and before assignment to duty, a preliminary training or drill in culinary art, receiving instruction at some central station to qualify them to meet the exceptional conditions of naval life, and to secure as great a variety as possible in the wholesome preparation of the necessarily limited number of articles of food. At present the palling monotony of the boil is seldom relieved by an occasional roast, and then only at the price of a largess to both the berth-deck cook and the power at the galley.

The reform which has already been brought about in the *personnel* of the navy has received its strongest impetus in the development of the apprentice system, which has aimed to supply the service with cleanly, orderly, respectable and intelligent native-born youths, instead of the begrimed, besotted

illiterate, obscene *habitués* of sailor boarding-houses, among which, it was once argued, the naval rendezvous must display its flag in order to gain recruits, and these the overflow of the unclean beasts of the foreign merchant ship's forecastle. To the distinguished officers who have developed that system, against antagonism and discouragement, where they should have met with co-operation and assistance, sanitary science gratefully acknowledges its obligations. If any one would know how men as well as boys can be decently, economically and satisfactorily fed and clothed, let him go on board the "New Hampshire," where the system has ceased to be experimental. Questions of taste affect so largely the determination of articles of clothing, that so long as this is serviceable, durable, and supplied as a gratuitous outfit, that the recruit may not begin his career as a debtor, the sanitarian may keep silent, though I cannot but think that the substitution of an outer blouse like the white jumper will have a *morale*, if not a hygienic value.

When every deck and every state-room are lighted by large, unobstructed ports by day, and every store-room, *cul-de-sac*, and passage besides are flooded with electric light by night; when every one of these and every frame-space and every pocket in the limbers has a ventilating-pipe opening into it; when the holds are so stowed that passage-ways surround and separate them, and the bilges so constructed that they can be traversed from bow to stern; when every deck below the water-line is shellacked and kept dry as a kitchen-floor, and every locker and bulkhead is made to be taken down, preferably of metal, with latticed sides and perforated panels and wire doors, that the air may have full sweep through them, the seaman's dwelling will have had about all done that is possible to make it habitable and healthful.

But what of the sick? Will you, physician and surgeon, as well as sanitarian, forget them? Where is your sick-bay, your hospital? When all is done I have suggested there will be few sick, but these few I would neither crowd into the noisy, necessarily sombre, apartment in the bows, where the din of the steam capstan adds a new discomfort, but put them where they can be best cared for, and this with the least interference with the necessary routine of the vessel and the least annoy-

ance to the well—on the berth-deck, on the gun-deck, as near amidships as may be—and as it is impossible to provide a permanent bulkheaded apartment that will not be too large when there are but one or two sick, and too small when there are more, my own preference is to have a locality indicated by brass eye-bolts in the deck and by hooks in the carlings above, at intervals of eight or ten feet, to which canvas panels can be attached, isolating a space varying in size, according to the need of the moment, marked on the plan of the ship, as intended for the accommodation of the sick, and called the "hospital space." When there may be no sick, room will here exist for the overflow of crowded quarters elsewhere by night, enlarging by day the breathing and working capacity of the deck. Trivial cases should remain on deck in the open air, designated by a distinguishing badge on the arm, as a white canvas band bearing a Geneva cross, that they may be known as on the sick-list, and neither be called upon for work nor allowed to interfere with the workers, while a convenient office for examining, prescribing, operating and clerical duty, communicating with the dispensary, will meet all other necessities of the medical department.

Standing on the eminence we have attained to-day, as we pause and look back and down upon the darkness out of which we have ascended—the only thirty years ago when ironclads, torpedoes, ventilating apparatus, electric lights, and speaking-wires were not—let us not flatter ourselves that the goal is really won. There are heights beyond us, and three decades hence those who have reached them may have even greater cause for exultation. Just as the Alpine climber finds the view broader, the sunshine brighter, the little things of the world shrinking into nothingness, and losing themselves in the grander features of the prospect, so as we mount in the scale of progress, under the brighter light of intellectual development, the farther recede the figures of the old salt and the despot of the quarter-deck. A catholic spirit of emulation and fraternal rivalry to contribute to the general good, the higher scholastic character given to the Naval Academy, and a consequent nobler *esprit du corps* among officers, the elimination of all ideas of caste and personal consequence, the elevation of the common sailor in the rank of humanity through the influ-

ences of the apprentice system—these are the real elements of future promise. Thirty years ago the fit and the unfit were chained hand to hand, and survived alike. Thirty years hence, let us hope that *palmam qui meruit ferat*, and only they survive who exhibit the greatest intelligence, the greatest industry, and the greatest skill.

A DISEASE NOT CURABLE BY PHYSIC.

A correspondent has sent the following clip without credit as to source, as a model for a cautious advertiser:

Have yeez pains in yer bones, or a botherin' ache
In yer jints afther dancin' a jig at a wake ?
Have yeez caught a black eye from some lounderin' whack ?
Have yeez vertrebral twists in the sphine av yer back ?
Whin yer walkin' the strates are yeez likely to fall ?
Don't whisky sit well on yer shtomach at all ?
Sure it's botherin nonsense to sit down and wape,
When a bit av powdher 'ill put yeez to slape ;
Shtate yer symptoms, me darlins, and never yeez doubt,
But as sure as a gun I can shtraiten yeez out.
Come thin, ye poor craythurs, and don't yees be scairt !
Have yeez batin' and lumberin' thumps at the hairt ?
Wid ossification and acceleration,
Wid attenuation and ragurgitation,
Wid amaciation and axascerbation,
Wid pracipitation and hapitization,
Wid praoccupation and avaporation,
Wid hallycination and acrid sacration,
Wid black arruption and purtification,
Wid great jactitation and conagulation,
Wid square titilation and cowld perspiration ?
Be me sowl ! But I'll bring all yer woes to complation;
Onless yer in love—*thin* ye're past all salvation.

WATER SUPPLY.*

BY O. R. LONG, M.D.

In all sanitary investigations the question of water supply is one of the first points of inquiry, and if the teachings of hygiene on this subject were followed it would put a check on many diseases. While for many public uses absolute purity is not essential, it is for private use, and the aim should be to get water pure enough for domestic use, in quantity sufficient for all purposes. To have two grades would be to invite evil results. The quantity of water required per capita is not fixed. It varies in different cities according to the habits of the people, manufacturing towns needing the most, and there are various causes that influence the amount used. The average daily supply in various cities, in regard to which statistics are obtainable, is given (in imperial gallons) as follows:

London, 32⅜; Glasgow, 50; Edinburgh, 35 imperial gallons. New York, 100; Providence, 45; Chicago, 112, American gallons per capita, on the basis of total population. Hygienists are agreed that 16 gallons per capita for domestic use, exclusive of water-closets, would be abundant for perfect cleanliness. In case of necessity, this could be reduced to seven gallons, the least that could be used without danger to health. For water-closets and waste, nine gallons a day is a moderate estimate. For municipal and trade uses, 20 gallons for manufacturing towns, and 10 for others, per capita, is Prof. Rankine's estimate. Hence, total for all purposes is as follows:

Domestic supply, including baths	16 gallons.
Water Closets	6 gallons.
Waste	3 gallons.
Town and trade purposes	10 gallons.
Total	35 gallons.

The estimates are based on the imperial gallon, and the addition of eight gallons would make 43 American gallons per capita per day, a very liberal estimate.

* Abstract of paper on the Water Supply of Ionia, Mich., read before Sanitary Convention at Ionia, December 14, 1883.—*From Ionia Sentinel.*

The effects of an insufficient supply need not be enumerated. Among them are personal uncleanliness, scant water for cooking, using same water more than once, dirty houses and streets, impure air, lowered state of health and the spread of disease.

The source of the public water supply in Ionia is one well, six springs and one reservoir. The well is 15 feet deep, 30 in diameter, and its estimated daily supply 115,133 gallons. This serves also as storage well for the water that flows in from the springs through one discharge pipe, and has a capacity of 52,000 gallons to the overflow pipe. The springs supply 240 gallons per minute, 345,400 gallons each 24 hours, making total from well and springs, 460,533 gallons, which allow over 83 gallons a day per capita, for a population of 5,500. The reservoir is 12 rods square and 4 feet deep, hence having a storage capacity of 1,173,065 gallons. It is filled by the inflow of East Creek, which is not estimated, but is abundant. The reservoir is connected with the conduit from springs to well, but a valve prevents the entrance of any from this source—it being intended merely as a reserve supply, to be used only in case of a protracted fire, the well being able to furnish water for six streams through inch nozzles, with 60 pounds' pressure, for from one hour and thirty minutes to one hour and fifty minutes. A contingency requiring more than that is very remote. The question of the source of these springs is one difficult to solve. No hydraulic engineer has ever been employed to furnish a report with reasons, and there are few reliable data as to the geological formation of the vicinity. A boring was made on the site of the well to the depth of 90 feet, giving the following result:

Muck	3½ feet.
Marl	2½ "
Coarse cobble stone	1 "
Gravel	13 "
Muck	5 "
Clay (bluish)	7 "
Dry sand	58 "

It is known that the surface stratum of muck does not exist on the hillsides, and it is probable that the other strata do not bear the same relation as here found.

The source of all water is the rain and snow that falls upon the earth's surface. There are two theories as to the immedi-

ate source of the Ionia water supply. First, the residuum of the snow and rain which falls on the highlands for a considerable distance around Ionia, and is not lost by surface drainage, absorption or evaporation, percolates through the soil, and reaching a bed of gravel resting on an impervious bed of clay, issues at the foot of the hills where the springs are. Second (a theory adopted by those who think there is too much water to be accounted for by the above hypothesis,) the water comes from Woodard Lake, six miles due north, half a mile wide, 138 feet above the level where Ionia springs appear. On this theory this lake has an underground outlet, and its water follows the gravel stratum toward Grand River, 225 feet below, and a portion of it emerging as before described. Whatever their source, the springs are perennial—were flowing when the earliest settler set his foot in the valley, and still gush forth in undiminished quantity.

To carry this water to the citizens there are duplicate boilers and pumps of 60 horse-power each, one of which runs constantly. There is no doubt that the quantity of the water and facilities for distribution we now have, will be enough when the population of our city will have quadrupled. The pump can distribute, if need be, a million and a half of gallons in twenty-four hours.

Next as to its purity. No water is absolutely pure. Even rain-water obtained directly from the clouds often contains impurities washed from the atmosphere, especially near towns. Water made pure by distillation is tasteless and insipid, owing to the absence of gases and mineral salts. Moderately hard water is more palatable, and many claim more wholesome, than pure water.

The origin of impurities in water are various, and may be referred to substances found at the source in transit to storage, in storage place, or in distribution.

The exact effects of using impure water are not well defined. Some deny that even considerable quantities of organic or mineral impurity can be proven to produce any ill effects; others claim that a certain portion of mineral ingredients are useful. Doubtless disease-producing water often acts so insidiously as to elude observation, while the cases are numerous where disease has been traced directly to the use of impure water. Dys-

pepsia, diarrhœa, dysentery, malarious and typhoid fevers, cholera, yellow fever, goitre, etc., are among the diseases referred to the use of water more or less poisoned by impurities. The springs that form the source of our water supply issue at the foot of the hills at a height of 84 feet above Grand River, and the hills rise thence abruptly to a height of 130 feet above the river. The springs are at an average distance of 30 rods from the storage well, on land owned by private parties. Three have a depth of 8 feet, 5 feet of which is in gravel. Two are walled with stone, the first eight inches from the bottom laid dry, the remainder in water lime, the walls extending about one foot above the surface. The third is laid in brick in a similar manner, and all are covered with flag-stone. The fourth, five feet deep, has a dry wall, and is protected by a wooden spring-house, the outlet conduit being about three and a half feet below the surface. The fifth, called the Lovell spring, is not walled, and the exact depth below the surface and method of protecting are unknown to the writer. The sixth spring is in the cellar of an occupied house; is 18 inches below the cellar-bottom, walled with brick and covered with stone. Three of them—the Lovell, the Burhans and the one in the cellar—may justly be viewed with suspicion; the two first because there is danger of contamination from surface drainage; the last for the reason that it is under a building which has been used for twenty years as a tenement, which has no cellar-wall posts, and boards serving in lieu thereof; no ventilation in the way of cellar windows, and no drain to carry off refuse matter—the custom having been to throw this on the surface near the house. About seven rods east is a privy vault, with trend of surface-water westward. The chances of contamination of the water in this spring seem to me, therefore, to be very great, and it should be excluded.

In the case of three of these springs I should say that contamination is hardly possible. With two of them (Burhans and Lovell) it is possible, though perhaps hardly probable. In the case of the one in the cellar, it is highly probable.

The well is so well protected that the only danger to it arises from the possible contingency that a fire will occur, rendering it necessary to turn in the water from the pond—which is of acknowledged impurity.

Measures should be taken to keep the water in the pond as pure as that in the well, so no danger may arise from having two grades. The danger in distribution is reduced to a minimum.

Dr. Kedzie's analysis (given in this paper) shows a total of 21 grains of solid matter in an imperial gallon of 10 pounds.

The Sanitary Congress at Brussels decided that water containing more than 35 grains of impurity, or much more than one grain of organic matter to the gallon, should be rejected as unwholesome. The Ionia water has only 21 grains of impurity, and less than a grain of organic matter to the gallon.

The Ionia water is hard; but the degree of hardness (16 degrees) is hygienically not objectionable.

Statistics in no case show an increase of the death-rate from the use of hard water. The only authenticated cases where goitre was caused by hard water, has been where the lime and magnesia existed in much larger quantities. A large number of convicts in the Durham jail were afflicted with goitre caused by drinking water containing 77 grains of lime and magnesia salts per gallon. When water containing only 18 grains was substituted, the disease disappeared.

There is no good reason for the belief that less than two grains of magnesia in the imperial gallon will produce goitre.

SIMPLE TESTS FOR THE PURITY OF WATER.—In suspected potable water for persons who cannot command chemical analysis, the following tests are recommended, as being generally available and reliable:

Color.—Fill a bottle made of colorless glass with the water; look through the water at some black object; the water should appear perfectly colorless and free from suspended matter. A muddy or turbid appearance indicates the presence of soluble organic matter, or of soluble matter in suspension. It should be "clear as crystal."

Odor.—Empty out some of the water, leaving the bottle half full; cork up the bottle and place it for a few hours in a warm place; shake up the water, remove the cork and critically smell the air contained in the bottle. If it has any smell, and especially if the odor is in the least repulsive, the water should

be rejected for domestic use. By heating the water to boiling, an odor is evolved sometimes that otherwise does not appear.

Taste.—Water fresh from the well is usually tasteless, even though it may contain a large amount of putrescible organic matter. Water for domestic use should be perfectly tasteless, and remain so even after it has been warmed, since warming often develops a taste in water which is tasteless when cold. If the water, at any time, has a repulsive or even disagreeable taste, it should be rejected.

Heisch's Test for Sewage Contamination.—The delicacy of the sense of smell or taste varies greatly in different individuals; one person may fail to detect the foul contamination of a given water, which would be very evident to a person of a finer organization. But if the cause of a bad smell or taste exists in the water, the injurious effect on health will remain the same whether recognized or not. Moreover, some water of very dangerous quality will fail to give any indication by smell or taste. For these reasons I attach special importance to Heisch's test for sewage contamination or the presence of putrescible organic matter. The test is so simple that any one can use it. Fill a clean pint bottle three-fourths full of the water to be tested, and dissolve in the water a teaspoonful of the purest sugar—loaf or granulated sugar will answer—cork the bottle and place it in a warm place for two days. If in twenty-four to forty-eight hours the water becomes cloudy or muddy, it is unfit for domestic use. If it remains perfectly clear it is probably safe to use.

POTATO PANCAKES make a most excellent dish for supper. Serve with the same embellishments in the way of pickles, sauces, as you would do were the dish you were offering fried oysters. Grate a dozen medium-sized potatoes, after peeling them and washing thoroughly. Add the yolks of three eggs, a heaping tablespoonful of flour, and if they seem too dry a little milk will do to thin them, with a large teaspoonful of salt, and lastly the whites of the three eggs beaten stiff, and thoroughly beaten in with the potatoes. Heat your griddle and put butter and lard in equal proportions on it, and fry the cakes in it until they are brown. Make them a third larger than the ordinary size of the pancakes.—*Anonymous.*

THE USE OF TOBACCO.*

BY LEMUEL CLUTE, ESQ.

Mr. Clute said that in submitting his paper on tobacco he acted only as a middle-man, and claimed no merit for original research. That if we could confine the effects of the use of tobacco to those who use it, it might be well to pass the subject, but this cannot be done—a person might as well live with a skunk in the cellar and make no effort to get him out as to permit tobacco users full swing in society. He noticed the following effects of tobacco:

1. It tends to make those who use it filthy and regardless of the comfort of others.

2. But by far the worst effect of its use is the terrible inroad it is making on the health of our people. To show its poisonous effects upon the human system he cited from Taylor on Poisons, a standard work, used as good authority in our courts. From this excellent authority he stated that those who work in tobacco factories are poisoned by inhaling the vapor which arises where large quantities are kept.

The practice of smoking and chewing produces a kind of morbid luxury, and is as earnestly to be condemned as the opium habit of the Chinese. Numerous cases were cited from Taylor, showing death to have occurred from tobacco poisoning.

That in a sense the system adjusts itself to the use of tobacco as that of opium chewers and arsenic eaters does—that those who insist that because many who use tobacco escape without seeming direct injury to health, it is therefore harmless, could with like reason show the opium habit harmless.

That though the father may use it and escape, he transmits a tainted blood and corrupt taste to his children.

According to Taylor, the best known effects of tobacco are to produce blindness, palpitation of the heart, paralysis, diarrhœa and diseases of the teeth and mucous membrane of the mouth and tongue, and many other nervous diseases, which those who use it assign to other causes.

* Abstract of paper read before Sanitary Convention at Ionia, Mich., December 14, 1883.—*From Ionia Sentinel.*

In addition to Taylor, Mr. Clute read from the written opinions of Dr. Avery and Dr. Martin, of Greenville; Drs. Barnes, Logan, Long and Romig, of Ionia, all agreeing that tobacco is exceedingly injurious—that it is much more so for young people than for older—the authority of these well-known physicians he added to Dr. Taylor's work on poisons, and insisted that in view of the uniform opinion of those most competent to judge of the evil effects of this weed, it is most incredible to think of the annual waste of muscle, blood and energy of our people because of the production, manufacture and use of tobacco.

He quoted the following extract from the journal kept by himself, when on a voyage at sea. The reference being to the Island of Nu-ka-hi-ra, one of the Marqueses group, in the South Pacific Ocean.

"Tuesday, Feb. 27." To-day I have been ashore with others of our crew; having a day of liberty and general recreation, visiting among the natives, and rambling about their beautiful island; among the curious things which I noticed as forming a part of the manners and customs of the people is the disgusting habit they have of lunching from each other's heads—they actually partake of warm living flesh from each other, and this without any process of vivisection whereby the head is at all mutilated or in the least harmed. The method is simply this—not having much to do for the inside of the head they devote the outside to raising lice, and it seems to be a comfortable pastime for one to sit and with his companion's head in his lap carefully pick out and eat the lice.

The sight of such a feast was a matter of great interest to us all, and the disgusting habit freely denounced as a heathenish practice, only possible to be found among the very lowest order of the human race. One of our crew, a sturdy young man from New England, with a fine physical development and fair mental power, insists that before witnessing this sight he had no thought that any portion of mankind were ever so low in their tastes, and that the spectacle tended to make him a confirmed believer in Darwin's theory of the origin and development of the human race.

But I noticed that my friend, in making his sharp criticism of this South Sea Island habit, had a large chew of plug tobacco

in his mouth, and frequently sent out over the deck a quantity of tobacco-juice and saliva. The thought occurs to me, which is the most to be condemned, these ignorant savages for eating lice which in no way harm them, are inexpensive, and to their taste luscious and fat, or the use of tobacco by one who knows better, and has had the full benefit of schools and all the advantages which pertain to a highly civilized race? Is civilization after all a mere matter of taste, and the poor islander to be frowned upon as of heathenish habits merely because he prefers lice to tobacco? Tossed in a whale ship's forecastle here in this remote harbor on the Pacific, I will attempt no answer, but when I get home, have some of the wise men of America tell me and explain in just what civilization consists."

The speaker said that perhaps the most that can be said in favor of civilization is, that we sin with light—we know better than we do. But sanitary reform recognizes no venerable errors—no ancient cobwebs of superstition are too sacred to be swept away by the reformer's broom. He showed that in Germany the evil effects of tobacco are exciting alarm, and the general drift of thought is against its use.

That what he had said of its injurious effects on the human system was based on the best medical authority, and that each citizen should use his influence to stay the tide of woe which this pernicious habit is fast raising over the human race.

THE RELATION OF SANITARY SCIENCE TO NATIONAL HEALTH.*

BY REV. J. PIERSON.

To the question, does sanitary science pay? the speaker replied by showing that obedience to sanitary laws promoted the wealth of the country. Capital or wealth is the creation of labor, and whatever diminishes the number of the laborers in any country, or lessens the amount and efficiency of their labor, diminishes the amount of a nation's capital, and such was the effect of preventable disease. War is generally regarded as the great scourge of the race. More than 4,000,000 of men fell in the wars of the first Napoleon. Estimating the value of every able-bodied man to the country at $2,500, there was a

*Abstract of Presidential Address delivered before Sanitary Convention at Ionia, Mich., Dec. 13, 1883. *From Ionia Sentinel.*

pecuniary loss to Europe of $10,000,000,000. But disease is a greater scourge than war. The plague of Black Death, which raged in Europe in the 14th century, destroyed 25,000,000 of lives. In our late civil war 600,000 men fell on both sides of the contest; but during every year of the contest a far larger number of our population fell outside of the two armies from preventable diseases than were lost during the same time from the ranks of the combatants.

According to the census of 1880, 756,893 persons died during the census year. Estimating that one-half of these died from preventable diseases, and estimating, also, that the average value of their lives was $800, we have as the aggregate pecuniary loss to this country by death, $302,756,800. Dr. J. H. Kellogg estimates the pecuniary loss to Michigan alone in the value of lives lost, according to the census of 1880, from preventable diseases at $4,585,000.

But to the value of lives lost, we are to add the cost of sickness, loss of time, the expense of nurses, medical attendance, etc., and also the expense of almshouses, asylums, and hospitals, which are to a great extent, directly or indirectly, the result of preventable disease, and the aggregate is an immense sum. Dr. Kellogg estimates the cost of preventable disease to the State of Michigan at $10,000,000, or $6 per inhabitant, and irrespective of the pecuniary value of lives lost, the cost to each inhabitant would be $3.20. Assuming the same cost for the entire country, then we have as the cost of preventable disease, irrespective of the pecuniary value of lives lost, $160,000,000. This, added to the value of the lives lost by such disease in one year, gives us as the aggregate the enormous sum of $462,756,800, as the cost of preventable disease to the country.

It is evident from these facts that sanitary science promotes the saving of national wealth. Such have been its practical results. The death rate in the city of London 200 years ago was 80 per thousand. It is now but 20. In 12 English towns, by the introduction of sanitary improvements, the average reduction of typhoid diseases alone was 47⅞ per cent. No State, nation nor municipal corporation can make a more profitable investment of its means than in expenditures for promoting public health. It is a poor economy which withholds such appropriations.

EDUCATION IN THE UNITED STATES.

REPORT OF THE COMMISSIONER OF EDUCATION FOR 1881.

Attention is called to the causes which prevent the publication of this report at the usual time for public documents, *i. e.*, the assembling of Congress. The office depends largely for its material upon the voluntary assistance of more than 8,000 collaborators, and must necessarily accommodate itself somewhat to their wishes and convenience. Moreover, the clerical force of the office is considered extremely limited, as compared with the labor necessary to the proper performance of its work, of which the preparation of the annual report is but a single item.

An interesting feature of the report is a series of tables derived from the census of 1880, and used as an introduction to the statistics collected for the year. They afford useful information about the population subjected to the influences of education in this country. In 1880 the native population numbered 43,475,840, and that of foreign birth, 6,679,943; the excess of males over females in the total population of 50,155,783 was 881,857, the country east of the river Ohio and the lower Mississippi having a slight excess of females and the other parts an excess of males. As regards race, the whites numbered 43,402,970; the colored, 6,580,793; the Orientals, 105,613; and the Indians paying taxes, 66,407; the colored population lives chiefly south of the Missouri, Ohio and Potomac Rivers, the foreign-born whites north of those streams, and the Chinese on the Pacific coast, where the great preponderance of males over females is aggravated by the almost total absence of Chinese women.

Of the native population of the Union, it is observed that 33,882,734 lived in the States where they were born, while 9,593,106 lived in other States; seventeen States and one Territory showed a net loss of native stock, but in many cases this loss is more than made up by the immigration from other countries.

The German empire contributed 1,966,742; Ireland, 1,854,571; Great Britain, 917,598; British America, 717,157; and the Scandinavian countries, 440,262 to the population of the Union in 1880. Germans exceeded any other class of foreigners in

sixteen States; the Irish exceeded any other class of foreigners in ten States and the District of Columbia; persons from Great Britain were more numerous than from any other foreign country in two States and two Territories; British America contributed the most foreigners to four States and one Territory; the Spanish-speaking lands to the South colonized most numerously in two States and two Territories, and the Scandinavians in one State and one Territory.

Turning from the population in general to the minor population of the country, the census of 1880 reported 25,234,346 minors in the Union; of whom, by State and Territorial laws, 16,265,089 were of legal school age. Some brief but important comments are made in connection with these statistics, showing that not only are the minors of the Southern States much more numerous in proportion to those of the Northern and Western States and Territories, but that the Southern States, in their attempt to afford school privileges to as large a number of their minors as possible, have usually adopted long periods of legal school age; Mississippi, for example, had 43 adults to 57 minors, while Massachusetts had 57 adults to 43 minors. The disadvantage under which the Southern States are laboring is still further aggravated by their comparative poverty.

A further analysis of the school population in 1880 shows that it consisted of 13,302,007 native whites, 719,929 foreign whites, 2,243,153 colored, Chinese and Indians, and that the males numbered 8,167,645, and the females 8,097,444.

There are sixteen different school ages in the United States, the longest being from 4 to 21, the shortest from 8 to 14. The difference in this respect must be considered in comparing the school population, funds and expenditure of the several States and Territories. The total school population for 1881 is 15,879,506; the total enrollment in public schools, 9,860,333; and the average daily attendance, 5,664,356. Four States, one Territory, and the Creeks of Indian Territory do not report the last item.

The total number of teachers employed in public schools in the States and Territories (Indian Territory not reporting) is 289,159.

With reference to the *qualifications of teachers* the Commissioner observes :

"The teachers of the United States bear favorable comparison with those of England and France, in which countries it must be remembered popular education is of recent development; the advantage does not seem to be with us if the comparison be extended to Prussia and Switzerland. There are exceptional districts, in which the teachers are carefully chosen, well paid, and retained from year to year, but in general our rural schools are suffering the natural consequences of a low estimate of the requirements of the service as expressed in careless appointment, meagre wages, uncertain tenure, and absence of systematic, efficient supervision."

Courses of study receive attention, and an outline of a course to be completed in nine five months' terms is quoted. The neglect of elementary science is deplored, although reading, writing, and arithmetic are deemed the principal subjects of instruction.

As a means of indicating the extent to which the schools fall short of the obligation to instruct all the youth of the country, the Commissioner presents the statistics of minor illiteracy from the census of 1880.

In the treatment of the subject the country is divided into three parts, the States north of the Missouri, Ohio, and Potomac Rivers, from the Atlantic to Kansas and Nebraska, being considered the Northern group; the District of Columbia and the States south of those rivers, including Missouri, Arkansas, and Texas, being considered the Southern group, and the rest of the Union constituting the Pacific group.

The illiterate white males between 15 and 20 years old were more than 3 per cent. in the Northern group, more than 18 per cent. in the Southern group, and nearly 7 per cent. in the Pacific group of the population of the same age. The illiterate white females were more than 2½ per cent. in the Northern group, more than 16 per cent. in the Southern group, and about 8 per cent. in the Pacific group, compared with the population of similar years.

Comparing these percentages with those of colored illiteracy, the Commissioner directs attention to the enormous difference between the two races, showing that for the Union as a whole the colored minor illiterate percentage is in excess of the white minor illiterate percentage 55 in 100.

Colored illiterates between 10 and 14 years old were, to the colored population of the same age, 16 per cent. in the Northern group; more than 69½ per cent. in the Southern group, and nearly 49 per cent. in the Pacific group. Colored illiterates between 15 and 20 years of age were 16 per cent. in the Northern group, 67 per cent. in the Southern group, and 33⅓ per cent. in the Pacific group, compared with the colored population of like age.

Out of 4,880,531 white persons between 10 and 14 years old in the Union, 579,194, or nearly 12 per cent., were unable to write; of 834,655 colored persons of the same age, 552,771, or more than 66 per cent., were unable to write. Of 5,295,667 white persons between 15 and 20 years old, 383,423, or more than 7 per cent., were ignorant, and of 829,317 colored people of like ages, 520,207, or nearly 63 per cent., were so. The statistics force the Commissioner to remark how great the need is for special effort toward the cultivation and improvement of the colored youth in our nation.

The following statistics are derived from a series of tables having reference to school provision for the colored population of the South:

Total white school population of 16 States and the District of Columbia, 3,954,600; enrollment in public schools, 2,234,877; colored school population, 1,929,187; enrollment, 802,372. Total public school expenditure for both races in the section specified, 13,359,784. For the further instruction of the colored race there are reported 47 normal schools, with 258 instructors and 7,621 students, 34 institutions for secondary instruction with 126 instructors and 5,284 students; 17 universities and colleges with 126 instructors and 2,203 students; 22 schools of theology with 59 instructors and 604 students; 3 schools of law with 12 instructors and 45 students; 2 schools of medicine with 18 instructors and 116 students, and 2 schools for the deaf and dumb and the blind, with 19 instructors and 120 students. Total number of institutions, 17,375; total enrollment, 818,365.

The Commissioner says: "Realizing the inadequacy of the means at command to overcome the ignorance and degradation of the masses of the freedmen as rapidly as the interests of society and good government require, the representatives of these

various philanthropic agencies unite in the appeal for national aid to education. It is worthy of note that the Senate of the United States has recorded itself in favor of the measure."

The provision for distributing the income of a fund during the first ten years on the basis of illiteracy would secure to the Southern States temporarily the special assistance which they need.

School accommodation and attendance. The following statements are made: In the Northern States, school accommodation is kept well up to the demand. Deficiency in this respect in Southern cities arises from lack of funds and from the fact that the establishment of public schools is so recent. Where such deficiency exists in the Northern cities, it is due to the rapid increase of population, and is complicated with the problems of immigration, pauperism, and the labor of children.

To accommodate the estimated number of children of suitable age for attending school in New York, the city would require 52,159 additional sittings; Brooklyn, 33,291; Chicago, 34,232, whereas the sittings in Boston are only 4,879 less than the school population. Boston is one of the cities in which the enrollment is less than the accommodation, while at the same time the attendance upon private schools is very small. In other words, the problem of school accommodation appears to have been solved by that city.

The 225 *normal schools* reporting had 1,573 instructors and 48,705 students, an increase of 5 schools, 107 instructors, and 5,628 students over 1880. The total increase in the number of normals reporting is 18; the total decrease 13.

The *business colleges* reporting number 202, and have 794 instructors and 34,414 students, 8,256 of whom are in evening schools. They have added 1,531 volumes to their libraries during the year, so that they now contain 44,095 volumes.

There 273 *Kindergarten* reported, with 676 instructors and 14,107 pupils, an increase of 5,236 since 1880.

Of secondary instruction, the total number of pupils in all classes of institutions reporting under this head is 224,815, or about 1 in every 223 of the population. Of this number 36,594 are reported in city high schools, 122,617 in institutions for secondary instruction, and 13,275 in preparatory schools. The

remainder are in institutions which do not make secondary instruction their chief end, viz.: normal schools, 13,136; institutions for the superior instruction of women, 7,016; universities and colleges, 29,976; and schools of science, 2,201.

Attention is called to the evidence furnished by the experience of the United States and of foreign nations that public high schools are essential to an efficient system of public schools, and to the important part which the high schools of the United States are taking in the adjustment of educational processes to practical demands.

With reference to secondary schools under the auspices of religious denominations, the Commissioner observes:

"They will always be an important factor in the progress of Christian communities, and it is gratifying to observe that the several denominations in the United States are moving for the larger endowment and more efficient conduct of the secondary schools under their patronage."

The number of institutions reported under superior instruction of women is 226, having 2,211 instructors and 26,041 pupils. To these may be added 5 colleges for women in New York, tabulated elsewhere, giving a total of 231 schools and about 27,000 students. Of the 26,041 students, 10,945 are reported in the regular college course.

The number of universities and colleges is 362, and they have 4,361 instructors and 62,435 students. Of the instructors 820 are in preparatory departments, and 3,541 are in collegiate; 28,959 students are preparatory, 1,017 unclassified, and 32,459 collegiate. The classification of 23,510 collegiate students is: Classical, 16,269; scientific, 4,403; special or optional, 2,378; graduate, 460. College libraries contain 2,522,223 volumes, 92,904 having been added during the year; society libraries, 419,056 volumes.

After a brief consideration of the general condition of colleges, the department of physical education and hygiene in Amherst (Mass.) College, and the progress of Yale College for the last 15 years, the subjects of elective systems, variations in college attendance, and schools of political science are treated at some length.

The variations in college attendance show the proportion of the inhabitants of different sections and of the entire country

in college. There is one college student to 1,034 inhabitants in New England; one to about 1,700 in the Southern States; one to 1,545 in the United States. The college attendance in 1880 is compared with that of 1830. Then there were (estimated) 5,200 students. The establishment of colleges north of the Ohio River had just commenced. The South had one student to 4,000 inhabitants; the Middle States one to 3,430; New England one to 1,281.

Schools of science number 85, and have 1,019 instructors and 12,709 students. These schools include 46 endowed with the national land grant of 1862, the United States Naval and Military Academies, and 37 private institutions. The endowed schools have 52 instructors and 1,911 students in their preparatory departments; 465 instructors and 4,281 students in their scientific departments. They offer 2,231 State and 137 other free scholarships. Their libraries contain 109,732 volumes.

The private schools of science have 7 instructors and 282 students engaged in preparatory work; 378 instructors and 5,738 students in advanced departments.

Schools of Theology.—Statistics show that they number 144, and have 624 instructors, 158 endowed professorships, 4,793 students, of whom 1,209 are credited with having received a degree in letters or science, 729,802 volumes in their libraries. Twenty-one of the schools are Roman Catholic, 18 Baptist, 18 Protestant Episcopal, 16 Lutheran, 16 Presbyterian, 12 Methodist, 11 Congregational, and 15 other denominations have from 1 to 6 schools each, while 2 are unsectarian. A summer school of Hebrew has been held at Morgan Park, Illinois, in order to give imperfectly educated ministers, and those ambitious to excel in Hebrew, an opportunity to pursue the study of it in vacation.

Law Schools report 229 instructors, 3,227 students, 849 of them as having taken a degree in science or letters, 933 graduates for the year, 86,229 volumes in libraries.

Schools of Medicine, Dentistry and Pharmacy number 126, and are attended by 14,536 students. The instructors are 1,746 in number. The schools of medicine are styled regular, eclectic, and homœopathic. The regular schools number 76, and have 1,213 instructors and 10,250 students, of whom 989 are graduate students. The libraries are meagre, containing only 40,757

volumes. Eight eclectic schools have 80 instructors and 882 students. The homœopathic schools are 12, with 173 instructors and 1,285 students.

Sixteen dental schools report 215 instructors, 703 students, 6,375 volumes in libraries.

The summary of statistics of pharmaceutical schools is: Number of schools, 14; instructors, 65; students, 1,416; graduate students, 10; graduates this year, 377; volumes in libraries, 7,695; increase in the last school year, 632.

Seventeen *Training Schools for Nurses* report 84 instructors, 414 pupils, 133 graduates in 1881, 1,464 pupils since organization, and a total of 754 graduates.

The Defective Classes containing children that may be educated, include (census, 1880,) 33,878 deaf mutes, 48,928 blind, and 76,895 feeble-minded—a total of 159,701 persons.

The number of institutions for the deaf and dumb is 57, and they have 431 instructors (of whom 68 are semi-mutes), and 6,740 students and pupils. The total number to whom instruction has been given is 21,691, of whom 246 have become teachers. Their libraries contain 39,538 volumes, an increase of 1,765 volumes during the year.

Thirty schools for the blind are reported, with 593 instructors and other employes, and 2,148 pupils. Employment is given to 133 blind persons. The total number of pupils since opening has been 10,241. The schools have libraries containing 22,991 volumes, an increase during the year of 2,007.

The statistics of schools for the feeble-minded report 14 institutions, 490 instructors and other employes, 2,490 inmates. The establishment of refuges for idiots is favorably noticed, and methods of instructing them are outlined. The investigation of the causes of idiocy is being prosecuted, and special appropriations for the purpose are recommended by persons interested in these schools.

Reform School statistics include the following totals: Number of schools, 71; teachers, officers and assistants, 539 male, 581 female, and 44 not distinguished as to sex; inmates committed during the year, 7,577; discharged, 7,052; present inmates, 11,961 males, and 3,665 females; 11,445 white, 1,420 colored; 6,552 native born, 1,305 foreign; commitments since establishment of schools, 153,163; volumes in libraries, 69,178, an increase of 2,964 during the year.

The homes and asylums for orphans and dependent children are 354 in number, and have 3,160 officers, teachers and assistants, and 34,814 inmates. The total number of inmates they have had is 368,892. They have 86,118 volumes in their libraries.

Thirty-one infant asylums have 547 officers, teachers and assistants, and 3,885 present inmates. They report the total number of inmates since organization, 56,380.

The 54 industrial schools reporting, have 504 officers, teachers and assistants; 23,618 present inmates; 171,564 inmates since organization; 11,321 volumes in libraries.

Benefactions.—The total of donations and legacies by individuals in aid of education, so far as reported to the office, amounted in 1881 to $7,440,224; an increase of $2,190,414 over the same for 1880, and the largest total reported to the office since 1872. More than one-half the whole amount ($4,601,069) was bestowed upon the universities and colleges of liberal arts. Schools of theology come next in the order of beneficiaries, receiving $962,535; secondary and preparatory schools received a total of $930,679. The claims of science do not seem to be sufficiently regarded by the benefactors of learning. It should, however, be observed that the entire amount devoted to this branch of knowledge is not comprised in the $177,058 reported for schools of science. The total for universities and colleges includes benefactions to departments of science, which cannot be separated from the general statement.

Public Libraries.—The statistics of additional public libraries show the number not reported in previous years to be 71, and the number of volumes in them 178,105. Fifty-nine report 25,125 volumes added during the year; 30 report 212,296 volumes issued during the year. The sum of the library statistics of the special report published by the bureau in 1876, and of the annual report of that and subsequent years, is as follows:

Total number of Public Libraries reported, each having 300 volumes or upwards	3,988
Total number of volumes	12,889,598
Total yearly additions (1,749 libraries reporting)	507,832
Total yearly use of books (883 libraries reporting)	9,912,760
Total amount of permanent fund (1,765 libraries reporting)	$6,832,657

Total amount of yearly income (1,000 libraries reporting)..... 1,474,585
Total yearly expenditure for books, periodicals and binding (923 libraries reporting)..... 636,594
Total yearly expenditures for salaries and incidental expenses (773 libraries reporting)..... 781,869

The figures for these items do not include the increase of the 3,647 libraries embraced in the special report on public libraries, or of the 270 additional libraries mentioned in subsequent annual reports.

THE CHICAGO RIVER.

(*From the Chicago Tribune.*)

You may boast of the odorous winds of Cathay,
And of Araby, oft called the Blest;
But visit, some beautiful, warm summer-day,
Chicago, the Queen of the West,
And I'll show you a river where fair flowers bloom—
Fair flowers whose odorous breath
Will bear you, by way of the beautiful tomb,
To the wonderful Valley of Death.

A flower called Typhus in beauty appears—
'Tis perfect in every part;
The dew-drops that gleam on its petals are tears
That were wrung from a poor mother's heart.
There are flowers called Cholera-Morbus, that bloom
With their heads looming high 'bove the rest;
Their odors so sweet that it lures to the tomb
The babe from its fond mother's breast.

Then talk not to me of the winds of Cathay—
They're spice-laden zephyrs at best;
But visit, some beautiful, warm summer-day,
Chicago, the Queen of the West,
And I'll show you a river where stenches abound—
They'll haunt you by night and by day—
And I'll bet you a *scent* they'll knock out, in one round,
The odorous winds of Cathay.

CHICAGO, Jan. 26, 1884. ROBERT TURNEY.

EDITOR'S TABLE.

THE NATIONAL BOARD OF HEALTH.

The following Bill was introduced in the House of Representatives, January 8, 1884, by Hon. Mr. Young. Read twice, referred to the Select Committee on the Public Health, and ordered to be printed:

A BILL to amend an Act entitled "An Act to Prevent the Introduction of Infectious and Contagious Diseases into the United States, and to establish a National Board of Health."

Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled, That section two of the act entitled "An Act to Prevent the Introduction of Infectious and Contagious Diseases into the United States, and to Establish a National Board of Health," be, and the same is hereby, amended, by adding thereto the following:

"And the National Board shall co-operate with, and, so far as it lawfully may, aid State and Municipal Boards of Health, in the execution and enforcement of the rules and regulations of such boards, and of the rules and regulations of the National Board of Health when the same shall have been approved by the President, to prevent the introduction of contagious and infectious diseases into the United States from foreign countries and into one State from another."

SEC. 2. That the Board of Health shall make such rules and regulations as are authorized by the laws of the United States, and necessary to be observed by vessels at the port of departure and on the voyage, where such vessels sail from any foreign port or place at which contagious or infectious disease exists to any port or place in the United States, to secure the best sanitary condition of such vessel, her cargo, passengers and crew; and when said rules and regulations have been approved by the President they shall be published and communicated to and enforced by the consular officers of the United States.

SEC. 3. That it shall be the duty of the National Board of Health to obtain information of the sanitary condition of for-

eign ports and places from which contagious and infectious diseases are or may be imported into the United States; and to this end the consular officers of the United States at such ports and places as shall be designated by the National Board of Health, shall make to said Board of Health weekly reports of the sanitary condition of the ports and places at which they are respectively stationed, according to such forms as said Board of Health may prescribe; and the Board of Health shall also obtain, through all sources accessible, including State and municipal sanitary authorities throughout the United States, weekly reports of the sanitary condition of ports and places within the United States; and shall prepare, publish, and transmit to State and municipal health officers and authorities weekly abstracts of the consular sanitary reports and other pertinent information received by said Board; and shall also, as far as it may be able, by means of the voluntary co-operation of State and municipal authorities, of public associations and private persons, procure information relating to the climatic and other conditions affecting the public health; and shall make to the Secretary of the Treasury an annual report of its operations, for transmission to Congress, with such recommendations as it may deem important to the public interests; and said report, if ordered to be printed by Congress, shall be done under the direction of the Board.

SEC. 4. That the National Board of Health shall from time to time issue to the consular officers of the United States, and to the medical officers serving at any foreign port, and otherwise make publicly known the rules and regulations made by it and approved by the President, to be used and complied with by vessels in foreign ports for securing the best sanitary condition of such vessels, their cargoes, passengers and crews, before their departure for any port in the United States, and in the course of the voyage, and all such other rules and regulations as shall be observed in the inspection of the same on the arrival thereof at any quarantine station at the port of destination, and for the disinfection and isolation of the same, and the treatment of cargo and persons on board, so as to prevent the introduction of cholera, yellow fever, or other contagious or infectious diseases.

SEC. 5. That to pay the necessary expenses of placing ves-

sels in proper sanitary condition, to be incurred under the provisions of this act, the Secretary of the Treasury be, and he hereby is, authorized and required to make the necessary rules and regulations fixing the amount of fees to be paid by vessels for such service, and the manner of collecting the same.

SEC. 6. That the President is authorized, when requested by the National Board of Health, and when the same can be done without prejudice to the public service, to detail officers from the several departments of the government for temporary duty, to act under the direction of said Board, to carry out the provisions of this act; and such officers shall receive no additional compensation except for actual and necessary expenses incurred in the performance of such duties.

SEC. 7. That all appropriations for the National Board of Health shall be disbursed under the direction of the Secretary of the Treasury on estimates to be made by the National Board of Health, and to be approved by him. Said National Board of Health shall, as often as quarterly, make a full statement of its operations and expenditures under this act to the Secretary of the Treasury, who shall report the same to Congress.

SEC. 8. That the unexpended balance remaining to the credit of appropriations heretofore made for the National Board of Health on the books of the Treasury Department, amounting to one hundred and twenty-seven thousand and eighty-three dollars and fifty-one cents, be and the same is hereby continued and made available for the purpose of carrying out the provisions of the several acts creating the Board and defining its powers. And of the appropriations heretofore made to enable the National Board of Health to aid State and municipal boards of health and local quarantine stations, to be used in case of epidemic, and now standing to the credit of said appropriation on the books of the Treasury, the sum of one hundred thousand dollars is made available for the same purpose during the fiscal year ending June thirtieth, eighteen hundred and eighty-five.

SEC. 9. That all acts and parts of acts inconsistent with the provisions of this act, be and the same are hereby repealed.

QUARANTINE FEES.

January 21, 1884, Associate Justice Fenner, of the Supreme Court of the State of Louisiana, rendered a decision justifying

the State in the imposition of a tax on commerce for the support of her quarantine establishment—reversing the decision of Judge Monroe, of the Civil District Court, against the same, a year ago. Our views on this subject were so fully stated at the time of Judge Monroe's decision (vol. XI, p. 108), it scarcely seems necessary now to do more than refer to them. The case briefly, however, is as follows:

The Legislature of Louisiana has enacted a law which exacts of all vessels passing her quarantines stated fees. At the Mississippi station these are: For every ship, $30; for every bark, $20; for every brig, $10; for every schooner, $7.50; for every steamboat (tow boats excepted), $5; for every steamship, $30. The amount thus collected is paid into a general fund for the support of the establishment.

Notwithstanding, Justice Fenner holds that—"The fees and charges complained of are demanded as compensation for labor performed, expenses incurred and services rendered directly in connection with the vessels, the necessity for which arises solely from the fact that such vessels, in the exercise of an undoubted right, yet voluntarily and in pursuit of their own interests, choose to seek the port of New Orleans, well knowing that they cannot enter said port without first being inspected, and, if necessary, purified, in conformity with laws to that extent unquestionably valid. Can it be said that the rendition of these services, by virtue of which alone the vessel is enabled lawfully to proceed to her destined port, is not a service to the vessel? * * * *

"Finally, it is claimed that the services rendered under these quarantine regulations are for the benefit of the people of the city and State, and not for that of the vessel. No doubt that is true. It is equally true that the object of the city in building wharves was to benefit its own people, trade and commerce. We deem it unnecessary to consider more at length the objections which have been forcibly urged against the theory that the services in question are rendered to the vessel in such a manner as to justify the exaction of compensation therefor. *What we have said sufficiently expresses our views on the subject, and while the question is not free from difficulty, even to our own minds, we are confirmed in our course by the reflection that it leaves the avenue open for correction of any error which we may commit, by appeal to the Supreme Court of the United States, whereas if we should err in the opposite direction, the defendants would not be entitled to that remedy.*"

The lines we have *italicised* are abundantly suggestive of

anticipated action upon a basis with which the Judge is evidently familiar, although he, for the time being, sustains the State law. As compared with the decision which it overrules, it is a reversal of judgment in the face of argument. According to the citations of Judge Monroe, that the law in question is clearly unconstitutional, Justice Fenner invites a decision to that effect, and, in our judgment, there is no doubt it will be forthcoming.

The *Picayune* undertakes to sustain the decision by comparing the law with the quarantine law of New York, from which it is radically different. The exactions under the law of New York are based upon services rendered and expenses incurred, at a rate of charge (in addition to the inspection fee of from one to three dollars for domestic vessels, and six and a half dollars for foreign), fixed by the Commissioners of Quarantine, depending upon the condition of the vessel and persons on board, but never as a means of enriching the State Treasury for the support of the establishment. The Louisiana law, on the contrary, imposes a tax for the explicit purpose of *raising a revenue* (although for the support of the quarantine establishment), in direct contravention of the Constitution of the United States.

THE MEDICAL SOCIETY OF THE STATE OF NEW YORK.

The seventy-eighth annual session of this Society was held at Albany, February 5–7, 1884. The President, Dr. Alexander Hutchins, of Brooklyn, in his opening address suggested that, with a view to more and better work, additional measures be taken at the outset of each year for securing papers. The work of the State Board of Health was worthily commended to the support of the Society and to the profession at large. Under its auspices, the State now has twelve hundred local boards of health. He advised the appointment of a committee to urge the passage of a bill now before Congress, providing for the erection of a fire-proof building for the use of the Army Medical Museum and Library. He called attention to the importance of hospital trained nurses as an advance in medical methods worthy of the greatest encouragement. He particularly dwelt upon the subject of medical education; the measures before the Legislature which provided for taking the power of licensing from the colleges; an authoritative registra-

tion of qualified practitioners; the relation of the State Society to the county Societies, etc.—all of which subjects he commended to earnest attention. Action with reference to the *codes* was carefully presented as an issue which had already disturbed the harmony of the Society and of much concern to its future prosperity.

At the conclusion of his address the President appointed the usual working committees, and the business of the Society proceeded: for the most part in the reading of papers and the discussion of subjects on curative measures. The evening of the first day was devoted to the discussion of the codes, which, by a vote of 124 to 105, sustained the action of the Society taken in 1882 and 1883, in favor of the "new code." Dr. E. V. Stoddard, Chairman of the Committee on Hygiene, reported upon the energetic measures instituted and maintained under the auspices of the State Board of Health for quarantining measles and scarlatina, especially in connection with the schools; and submitted the report of the Committee on Hygiene of the Medical Society of the County of New York, containing papers by Drs. S. O. Vanderpoel, E. G. Janeway, Stephen Smith and O. D. Pomeroy (as published in our February number). Dr. W. F. Sheehan, Health Officer of Rochester, N. Y., read an interesting and thoroughly practical paper on House Sanitation.

The proposed new medical law, known as the Erie County bill, elicited a good deal of discussion and final disfavor—by recommittal to the committee, with additional members, to report a year hence.

The annual address of the President on the Reciprocal Attitude of the Medical Profession and the Community, was an admirable presentation of the status of medicine and its votaries in the highest relations of progressive science in all of its departments. Preventive medicine, especially, was given a prominent place in progressive science, and an exhibit which bears favorable comparison with any other avocation in promotion of human welfare.

An outcome of the reaffirmation of the new code is a new organization, by a number of the members who had opposed it, under the name of the NEW YORK STATE MEDICAL ASSOCIATION. The special object stated, in justification of this organ-

ization, is to restore the relations of the profession in the State with the American Medical Association—not, so far as we are informed, to break relations with the parent society. It is understood that membership in any county society will constitute eligibility to the Association. A New York County Association has also been organized by the "old code" members, with the same view—to restore relations with the National Association.

STATE AND LOCAL BOARDS OF HEALTH REPORTS.

CONNECTICUT.—Report of the State Board for Dec., 1883, shows a generally favorable condition of heath. Lung troubles are decidedly assuming the front rank in the mortality lists, lung fever causing more deaths than any other one disease, except the epidemic diphtheria in Hartford. This has decreased in a great measure; the total number of deaths thus far is 182; during December 24 deaths were reported. As the frequency diminishes the laryngeal variety becomes more common. In two instances recently, tracheotomy has been resorted to satisfactorily in extreme cases.

Scarlet fever has reappeared in quite a number of places. Diphtheria has also appeared in several places. The effect of unsanitary influences inside the house has been shown in repeated instances. In several cases where everything was apparently right a careful search revealed very serious defects. Typhoid fever has been quite prevalent, unusually for December. Rheumatism and erysipelas more common than usual. A large number of deaths among old people are reported; thus, of the deaths in Bridgeport, seven were from 60–70 and two from 70–80, three from 80–83; and deaths from old age are reported from South Manchester, Suffield, Westport, Thomaston and Cheshire. An unusual condition of health is reported from Granby, where it is reported no case of filth disease has occurred during the last six months. Guilford reports no cases of acute disease for December. New Hartford and Cheshire report each one death, the latter from old age.

ILLINOIS.—The regular January—quarterly—which is also the annual meeting of the State Board of Health, was held in the rooms of the Board in the Capitol building, January 17th and 18th, 1884.

Certificates entitling to practice medicine under the Medical Practice Act were issued to eighty-six graduates upon diplomas from legally chartered medical institutions in good standing, and nine to practitioners on length of practice in the State; making in all 553 practitioners of medicine admitted to practice in Illinois during the year 1883. During the same period 163 applications have been refused, and eleven certificates have been revoked; thus directly reducing the number of practitioners by 174, through the enforcement of the provisions of the Medical Practice Act.

Scarlet fever has continued during the quarter in many localities, but without in any case assuming a serious epidemic form, while the death-rate from it remained unusually low. Small-pox has appeared at Stone Fort, Saline county; Farina, Fayette county; McLeansboro', Hamilton county; and Alton, Madison county. The disease was also reported, October 31, from Paris, Edgar county; but the case was subsequently ascertained to be chicken-pox.

Three outbreaks of trichiniasis—one of them resulting in three deaths—have occurred; the first during the early part of November, in a family near Gardner, Grundy county; the second and third during December, in Woodburn, Macoupin county, and in Bloomington, respectively. The Gardner and Bloomington cases resulted from eating uncooked pork and sausage, and the Woodburn cases from raw smoked sausage. Specimens of the meat from Gardner and Woodburn were sent to the Secretary for examination, the character of the disease being only suspected; until the microscope showed, in one case, about 2,000, and in the other, about 8,000 trichinæ to the cubic inch.

The investigations which have been made during the past four years, both in this country and abroad, show American pork to be freer from trichinous infection than that of other countries.

The recent loss of life by fire at Belleville suggests the point whether the Board can profitably take any further action looking to securing adequate provision for escape from, and for the extinguishing of, fires in public buildings. On different occasions within the past few years, the Board has called attention to this subject—the last time in the fall of 1881, with reference

to the danger from fire at seaside resorts, and this was emphasized, soon after the Secretary's circular letter was sent out, by the destruction of no less than six of these inflammable structures within a very short time.

Chicago sewage. On this subject the Secretary remarks: In my last quarterly report, speaking of the solution of the various questions hinging upon the disposal of the sewage from the city of Chicago through the Illinois and Michigan Canal, I observed that it was "clearly the duty of the city of Chicago, immediately upon the close of navigation, to have the Bridgeport pumps put into operation, and their capacity and the capacity of the canal determined by actual experiment." I am glad to say that this experiment is now being carried on, and I am in receipt of a telegram from Superintendent Thomas, announcing that the "Bridgeport pumps are working finely, and are holding three feet of water in the canal above the level of the Chicago River."

The remainder of the session was devoted to executive business, and the discussion of charges against individuals and colleges.

INDIANA.—The first convention of the "Indiana State Sanitary Society" will be held, under the auspices of the Committee on State Medicine, at Seymour, Ind., March 12–13, 1884.

KENTUCKY.—A State Sanitary Council at Bardstown, under the auspices of the State Board of Health, is to be held Wednesday and Thursday, March 26th and 27th, 1884.

The object of the Council is to bring together representative men of the State of every profession, who are interested in sanitary reform, for a comparison of views, and the discussion of methods relating to the prevention of diseases.

Amongst the subjects which it is expected will be presented and discussed are the following:

Address of Welcome, by Dr. Alex. Crawford, Chairman Committee of Arrangements.

An address by the President of the Council, Dr. J. A. Dixon.

The Prevention of Contagious and Infectious Diseases, Adulterations of Food and Medicines, The Sanitary Problems of Bardstown, The Relation of the Press to Sanitary Work, The Relation of Teachers to Sanitary Work, The Relations of Physicians to Sanitary Work, The Physical Dangers of Alco-

holic Beverages, School Hygiene, Ventilation, Sewerage, and Disposal of the Dead.

MICHIGAN STATE BOARD OF HEALTH REPORTS, for the five weeks ending Feb. 2, 1884, show that—compared with the average for the month of December, in the preceding six years, diphtheria, remittent fever, pneumonia, consumption and typho-malarial fever were less prevalent in December, 1883. The meteorological conditions for the same period, compared with the average of corresponding months for the five years, 1879–1883: the temperature was slightly higher, the absolute humidity the same, and the relative humidity and the day and the night ozone less.

In January, 1884, as compared with the average for the same month in the preceding six years, neuralgia was more prevalent, and diphtheria, rheumatism, typho-malarial fever, bronchitis, scarlet fever, consumption, pneumonia and remittent fever were less prevalent. The meteorological conditions for the same period, as compared with the preceding six years, 1879–1884: the temperature was considerably lower, the absolute humidity less, the relative humidity more, the day ozone more, and the night ozone the same.

IN LANSING, Mich., during the month of January, 1884, the number of deaths was 11. Population, U. S. Census, 1880, 8,319. Annual ratio of deaths per 1,000, 15.5.

OHIO SANITARY ASSOCIATION.—The first session of this Association convened at Columbus, at the time announced, February 14th, and held a very successful meeting for two days. Copies of the *State Journal* containing report of proceedings have kindly been sent us, but too late for abstract in this number.

RHODE ISLAND REGISTRATION REPORT, 1882, pp. 178, comprehends the Tables of previous years, with additional elucidations and illustrations. The returns for 1882 are:

Births, American, 3,427; Foreign, 3,398—6,825. Ratio to population, 1 to 40.5.

Marriages, American groom and bride, 1,500; Foreign-born groom and bride, 659; American groom and foreign bride, 242; Foreign groom and American bride, 233—2,634. Ratio to population, 1 to 52.5.

Deaths, American parentage, 2,429; Foreign parentage, 2,645—5,074. Ratio to population, 1 to 54.5.

Divorces applied for in 1882, 339; granted, 279.

In Providence County the proportion of divorces was about one to every nine marriages. During the period of fourteen years, ending with 1882, the proportion of divorces to marriages has been—in Bristol County, one to 18.5; Kent, one to 11.6; Newport (County), one to 23.7; Providence (County), one to 11.6; Washington, one to 14.3; whole State, one to 12.2

The number of deaths was the largest ever reported, but in ratio per 1,000 of population, 17.2 was about the average for the previous five years. The average age of decedents was 31.88 years. The chief causes of death were: Consumption, 737; diarrhœal diseases, 483; pneumonia and congestion of the lungs, 344; old age, 283; apoplexy and paralysis, 265; heart diseases, 255; fevers—typhoid, etc., 229; brain diseases, 173; accidents, 166; cancers, 132; convulsions, 110; diphtheria, 101. Consumption numbered a larger number of victims than in any previous year—15.83 per cent, or one in every 6.89 of the whole number of deaths were from this cause. The increase of deaths from this cause has been confined to the foreign population. Among those of American parentage the deaths from consumption have diminished from 313 in 1875, to 272 in 1882—about 13 per cent.; and for the same period, among the foreign, increased from 327 to 465—about 38 per cent.

PROVIDENCE, R. I.—The City Register reports for 1883—*Births*, 2,923; *Marriages*, 1,176; *Deaths*, 2,328. The births in 1883 were 135 more than in 1882; the marriages were four more, and the deaths 86 more. The largest number of births in any month was 251 in March, 1882, and 285 in June, 1883. The largest monthly number of marriages was 149 in November, 1882, and 143 in October, 1883. The largest monthly number of deaths was 247 in November, 1882, and 250 in July, 1883.

Calling the population of Providence 119,405 in 1883, the proportions of births, marriages and deaths to population in that year were as follows:

Births.....1 in 40.85, or 24.48 in each 1,000
Persons married.....1 in 50.76, or 19.69 in each 1,000
Deaths.....1 in 51.29, or 19.50 in each ,000

VITAL STATISTICS OF NEW YORK.—By estimating the population of New York at the end of the year 1883, instead of the middle, in our February number, the statistics of mortality as there given were not quite correct. It affords us pleasure to publish the following correction:

NEW YORK, Feb. 23, 1884.

Editor of THE SANITARIAN—Dear Sir: I respectfully inform you that the estimated population on July 1, 1883, was 1,317,691. The deaths for the year 1883 were 34,011, which gave an annual death-rate of 25.81 per 1,000 inhabitants. The deaths by classes were as follows: Zymotic diseases, 9,011; constitutional diseases, 7,575; local diseases, 13,949; developmental diseases, 2,150; and violent deaths, 1,326.

The deaths of persons 70 years old and over, were..... 2,345
" " " children under 1 year, " 8,671
" " " " " 2 years, " 11,325
" " " " " 5 " " 13,856

The number of deaths reported in tenement houses from measles was 515, and in private houses, 97; from scarlatina, 520 were in tenement houses and 187 in private houses; from diphtheria, 627 were in tenement houses and 338 in private houses; from membranous croup, 464 were in tenement houses and 144 in private houses; from whooping cough, 240 were in tenement houses and 69 in private houses; from typhoid fever, 186 were in tenement houses and 115 in private houses; from cerebro-spinal fever, 147 were in tenement houses and 52 in private houses; from malarial fevers, 272 were in tenement houses and 211 in private houses. Tenement houses contain 4 families or more; private houses contain less than 4 families.

JOHN T. NAGLE, M.D., *Registrar.*

NASHVILLE, TENN.—The Health Officer and City Registrar reports for 1883: Total number of deaths registered for the year: white, 606; colored, 569; total, 1,175. The rate for the white population was 18.68 per thousand; for the colored, 31.29; and for the whole, 23.50.

Deaths under five years of age: White, 181; colored, 224; total, 405.

The proportions given in this report are based upon a population (estimated) of 50,000, divided as follows: White—males, 16,238; females, 15,762; adults, 17,853; minors, 14,147;

total, 32,000. Colored—males, 8,293; females, 9,707; adults, 10,365; minors, 7,635; total, 18,000.

An ordinance requiring the registration of births has been in operation since June 1, 1881. There are many difficulties surrounding the workings of such a law. The register is by no means complete, and should not be compared with the death returns. The repeal of the Vital Statistics Act by the State Legislature has materially interfered with the enforcement of the city ordinance—the public having construed that action as an abandonment of the system.

For the year 1883 returns of births were received as follows: White—males, 258; females, 222; total, 480. Colored—males, 135; females, 97; total, 232. Total live births registered, 712. Stillbirths, white, 27; colored, 34; total, 61. Premature births, white, 17; colored, 12; total, 29.

RICHMOND, VA., February 13, 1884.

Editor of SANITARIAN: In the February number of your journal, in your notice of the *summary of deaths in Richmond*, you have fallen into an error. If you will cast your eye over it again you will find the number of children dying under five years of age is put down at 751 in place of 1,225. Of course, under that heading, the deaths of children under one year are embraced. I think it also desirable to keep a separate register of those dying under one year of age.

My reports are made according to the classification adopted by the New York City Board of Health. By examining it you will find that all *tubercular diseases* are embraced under the head of *Constitutional.* Only 263 persons died from consumption, as the report shows; not 308, as you publish it.

Affections of the lungs, other than consumption, are placed under the head of Respiratory System, such as pneumonia, bronchitis, etc., and these were only 178.

I hope these explanations will be satisfactory.

I will send my annual report as soon as it is published.

Respectfully, J. G. CABELL, M.D.,
President Board of Health.

PITTSBURGH, Pa., reports an annual death-rate for eleven years as follows:

1873, 26.46; 1874, 24.68; 1875, 21.12; 1876, 20.39; 1877, 23.50; 1878, 21.16; 1879, 19.49; 1880, 21.80; 1881, 27.23; 1882, 24.06; 1883, 18.96. Average ratio, 22.62.

THE SANITARY PROTECTION ASSOCIATION OF NEWPORT strongly advises purchasers or lessees of houses, and owners, whose residences have been temporarily closed, to have them carefully examined by its inspectors before occupancy. Inspectors: Dr. H. R. Storer, 38 Washington street, and Mr. Geo. N. Bell, Civil and Sanitary Engineer, 10 Catharine street, Newport, R. I. Orders for inspections may be sent by telephone to Mr. Bell through Messrs. George C. Mason & Son, Architects, 10 Catharine street. Fee for examination and report, $5.00.

PROPOSED ABOLITION OF THE TAX ON SEAMEN.—The Senate Committee on Commerce is reported to have acted favorably on an amendment to the shipping bill providing for the abolition of the present system of supporting the marine hospital service by a tax on sailors, and throwing the expense directly on the government.

A correspondent of the New York *Times* calls attention to the injustice and inconsistency in the terms of the law as it stands, on the subject of the marine hospital tax. Section 4,804 of the Revised Statutes of the United States denies "any benefit or relief from the marine hospital fund" to any person "connected with the navigation, management or use of canal-boats engaged in the coasting trade." But section 4,587 subjects all canal-boats licensed "for carrying on the coasting trade" to the payment of 40 cents per month for each man employed on such vessels, "except canal-boats employed in navigating the canals within the United States." Thus the payment must be exacted from such boats employed outside of the canals, but the men are not to be thereby entitled to hospital relief.

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MORTALITY STATISTICS IN THE UNITED STATES.

FOUR WEEKS, ENDING JANUARY 26, 1884. Correspondents under this head are requested to send reports promptly.	Total Deaths.	Deaths under 5 years.	Lung Diseases.	Diphtheria and Croup.	Scarlatina.	Measles.	Whooping Cough.	Fevers.	Small Pox.	Diarrhœal Diseases.	Annual rate per 1,000.
Burlington, Vt., 11,364	20	5	3	..	..	..	..	1	..	..	22.8
Boston, Mass., 427,940	698	200	259	47	22	..	3	14	..	20	21.1
‡Lowell, Mass., 70,000	103	40	18	3	1	..	..	4	..	3	17.9
Lynn, Mass., 38,284	51	11	12	3	..	..	..	1	..	1	17.1
Somerville, Mass, 27,651	32	11	10	1	..	..	..	1	..	..	14.9
Worcester, Mass., 58,295	87	27	21	6	4	1	1	2	..	..	19.4
‡Providence, R. I., 120,000	168	39	57	10	3	1	..	5	..	1	16.8
‡New Haven, Ct., 72,000	99	21	21	5	..	..	..	3	..	4	15.6
New York, N. Y., 1,325,092	2325	804	*837	64	44	30	20	†60	..	44	22.7
Brooklyn, N. Y., 624,118	1023	382	357	63	22	25	8	17	..	19	20.6
Buffalo, N. Y., 155,159	206	76	57	10	14	6	..	3	..	5	17.3
‡Rochester, N. Y., 101,900	141	36	50	9	..	7	1	4	..	1	16.2
Albany, N. Y., 90,903	162	47	52	11	8	..	1	6	..	..	23.1
‡Auburn, N. Y., 25,000	34	8	13	2	1	..	1	4	..	..	17.6
§Yonkers, N. Y., 21,000	9	4	1	1	..	..	..	..	..	..	21.2
West Troy, N. Y., 13,000	21	7	4	5	1	..	1	..	..	..	21.0
Hudson Co., N. J., 209,000	338	107	107	15	5	..	..	8	..	7	21.2
Paterson, N. J.	135	65	39	10	4	8	..	1	..	..	..
Philadelphia, Pa., 927,995	1196	411	322	100	42	5	2	47	3	10	15.3
Pittsburgh, Pa., 180,000	238	87	27	15	9	3	4	8	1	..	17.2
Erie, Pa., 27,730	43	17	10	4	1	..	1	3	..	..	20.0
Wilmington, Del., 51,500	72	27	8	7	3	2	..	2	2	1	18.1
§Cincinnati, Ohio, 280,000	113	37	41	1	..	..	1	6	..	2	21.0
†Cleveland, O., 194,000	207	45	24	9	1	2	..	3	..	3	13.9
‡Detroit, Mich., 135,000	271	63	55	57	4	1	3	4	..	5	23.6
‡Indianapolis, Ind., 100,000	140	48	50	2	1	..	..	3	4	1	18.2
Evansville, Ind., 40,000	53	19	18	1	..	..	..	5	..	..	17.2
Rock Island, Ill., 11,650	..	..	..	..	..	..	..	..	..	..	..
‡Chicago, Ill., 560,693	862	372	224	66	35	3	4	63	..	3	17.8
St. Louis, Mo., 400,000	634	247	181	77	17	..	5	20	3	2	20.5
‡Milwaukee, Wis., 130,000	178	49	27	16	15	1	1	5	..	2	16.4
Omaha, Neb., 45,200	50	24	18	4	4	..	..	..	..	1	14.3
Salt Lake City, Utah, 22,000	27	10	7	4	..	..	..	1	..	..	15.9
San Francisco, Cal., 235,000	386	101	112	2	2	..	..	21	..	..	21.2
‡Minneapolis, Minn., 90,000	103	44	25	15	2	..	..	3	..	1	13.3
‡St. Paul, Minn., 42,000	103	47	19	18	2	..	..	9	..	1	28.8
Baltimore, Md., 408,520	702	303	195	51	13	50	10	18	..	7	22.3
Dist. of Columbia, 194,910	398	80	119	8	12	31	7	9	..	2	26.4
†Richmond, Va., 66,000	146	50	41	2	1	2	3	2	..	5	24.6
§Lynchburg, Va., 20,240	10	3	3	..	..	..	..	..	..	..	1.51.6
New Orleans, La., 221,084	601	130	170	11	4	..	4	22	19	34	33.3
‡Nashville, Tenn., 50,000	88	26	33	2	..	2	1	4	1	2	21.1
‡Mobile, Ala., 31,295	99	18	39	..	..	..	..	5	..	2	37.9
Jacksonville, Fla., 10,000	8	2	4	..	..	..	..	..	..	..	10.4
†Toledo, O., 52,000	67	15	16	4	..	..	..	4	..	..	15.3

* Phthisis Pulm., Pneumonia and Bronchitis. † Typhus, Typhoid, Cerebro-Spinal and Malarial Fevers. * 3 weeks ending Jan. 19. § 1 week. ‡ month of January.

VITAL STATISTICS OF IMMIGRATION.

NAMES OF STEAMERS, DATE OF ARRIVAL, PORT OF DEPARTURE, NUMBER OF PASSENGERS, NUMBER OF DEATHS AND BIRTHS DURING THE VOYAGE FROM EUROPEAN PORTS TO NEW YORK, FOR THE MONTH ENDING JANUARY 31, 1884.

	Vessels.	*From*	*Passengers.*	*Deaths.*	*Births.*
Jan. 1,	Australia,	Hamburgh,	379	1	1
" 3,	America,	Bremen,	154		1
" 13,	Frisia,	Hamburgh,	303	1	1
" 14,	Oder,	Bremen,	215	1	
" 14,	Amsterdam,	Amsterdam,	72	1	
" 22,	Salier,	Amsterdam,	309		1
" 25,	St. Georgia,	Glasgow,	39	1	
" 26,	Rhein,	Bremen,	262	1	
" 28,	Zaundam,	Amsterdam,	81		1
" 29,	Gellert,	Hamburgh,	488	1	
" 31,	Gen. Werder,	Bremen,	356		1
			2,658	7	6

FOREIGN REPORTS OF MORTALITY STATISTICS for the month, for some unaccountable reason, have not been received in time for this issue.

ENGLAND.—By the Registrar-General's Quarterly Return for the third quarter of 1883, the number of deaths registered in England and Wales was 113,118, equal to an annual rate of 16.8 per 1000 of population; with the exceptions of 1879 and 1881, the lowest rate since civil registration commenced in 1837. In 28 of the largest towns, including London, and having an estimated population of more than eight and a half millions, the death rate averaged 19.9; in London it was 18.8. Of the whole 113,118 deaths, 30,331 were of infants under one year. The infant mortality, measured by the proportion of deaths under one year of age to births, was equal to 142 per 1000. 17,869 resulted from zymotic diseases, of which diarrhœa was far the most fatal. To it were referred 8,389.

INTERNATIONAL HEALTH EXHIBITION, LONDON, 1884.—The Sub-Committee on Heating, Lighting, Ventilating and Smoke Abatement have prepared a memorandum, indicating the principal exhibits which it is intended should be comprised within Classes 24, 25 and 26 of the exhibition. In Class 24 will be included grates, stoves, kitcheners, ranges, boilers, etc., for domestic use, and all methods of warming, with or without provision for ventilation. Domestic kitcheners will be included in this class, but appliances for cookery on a large scale will more

properly be arranged under Class 6 (Cookery, etc.) Furnaces and steam boilers for manufacturing operations are not considered to be within the scope of the present exhibition. In Class 25 (ventilators, etc.), will be included special appliances for ventilation, other than those which may be considered more suitable for Class 24. These will include means for cooling the air supplied to rooms; means for improving the condition of the air in rooms; methods for testing air; the results of experimental researches into the state of air vitiated by combustion or by respiration; results of experiments on ventilation, and any other means of effecting improvement in matters relating to this class or of diffusing knowledge about them. Class 26 takes in lighting by any means, electricity, gas, oil, candles, etc. Electric lighting, however, is to be limited to illustrations of its application to domestic lighting. Its use on a large scale will be practically illustrated by the arrangements made for lighting the exhibition itself. The commercial manufacture of gas is not included, though its production on a small scale for private use is. Exhibits showing the progress of domestic lighting, and affording means of comparison between old and new systems, are specially desired. Photometric and other tests for illuminating materials will be admitted.

LITERARY NOTICES.

PREVENTIVE MEDICINE: The Field of Disease, a Book of Preventive Medicine. By BENJAMIN WARD RICHARDSON, M.D., LL D., F.R.S., Fellow of the Royal College of Physicians, and Honorary Physician to the Royal Literary Fund. 8vo, pp. 737.

Though this work, according to the author's preface, has been written with special reference to intelligent non-professional readers, it excels any other book which has before fallen under our observation, on the subject of which it treats, as a text-book for the medical reader. It comprehends the nature, causes and prevention of disease from a strictly scientific standpoint. Deals with the etiology, and treats of the nature of disease as comprehended under conditions with which physicians,

even, are commonly much less familiar than they should be; of etiology, under the accepted nomenclature of the Royal College of Physicians; and of prevention from an accredited amount of physiological, pathological and chemical knowledge rarely found outside of a medical education. This feature of the work is far from being a demerit. For a mind so well trained in medical lore as the author, it is not surprising that he has failed in his intent, or that he has succeeded so well in filling a gap in medical literature hitherto open. And the American publishers have done the medical profession a valuable service in laying it before them, as a work that contains much with which every physician should be familiar. There is no other work in the language in which the information here presented can be found so systematically arranged and intelligently presented.

HINTS ON THE DRAINAGE AND SEWERAGE OF DWELLINGS. By Wm. Paul Gerhard, Civil Engineer. 12mo. pp. 312. Profusely illustrated. Price, $2.50. New York: Wm. T. Comstock.

Our readers are already familiar with the thoroughly lucid and practical style of Mr. Gerhard's contributions to sanitary works. This volume is an elaboration of the excellent paper on House Drainage and Sanitary Plumbing in THE SANITARIAN, vol. 10.

We commend this book as a brief manual to all architects, engineers, builders, mechanics, physicians, sanitarians and householders—to none more than the last—who would learn that there are mechanical means by which the common faults of house drainage may be remedied, and that "modern conveniences" are not necessarily dangerous.

LECTURES ON ORTHOPŒDIC SURGERY AND DISEASES OF THE JOINTS. Delivered at Bellevue Hospital Medical College during the winter session of 1874–1875. By LEWIS A. SAYRE, M.D., Professor of Orthopœdic Surgery and Clinical Surgery, in the Bellevue Hospital Medical College, etc. *Second Edition.* Revised and greatly enlarged. 8vo., pp. 589, with 324 illustrations. New York: D. Appleton & Co.

Few works have been more sharply criticised or highly praised than this, since its first appearance, seven years ago. And this criticism is not surprising, for to report Professor

Sayre's lectures in the forcible style characteristic of him is an exceedingly difficult matter. Whenever it becomes necessary—and it frequently does—for him to make choice of one of two ways in summing up the difference between his own conclusions and practice and the hitherto accepted—but to him erroneous—conclusions and practice of others, he invariably takes the most emphatic course for demonstrating wherein the case in hand is in conflict with previously accepted dogma. The detail of the difference in its historical aspects to him—in the lecture-room, at least—is of minor importace. But he is not unmindful of criticism, and this edition bears evidence of careful revision. To the critics who have called attention to his errors he expresses a deep sense of gratitude, as they have facilitated his labor in the correction of mistakes, and thus enabled him to profit by their suggestions. Of the general style of the work nothing more need be said. It will suffice to state that much to which exception was taken in the first edition has since been substantiated and accepted, and "Sayre's Orthopœdic Surgery" is now a work which no medical student, and few surgeons, can afford to do without.

In mechanical execution—paper, type, excellence of illustrations and binding—it is unnecessary to say more than it is of that degree of excellence common to the distinguished publishers.

"LONG LIFE, AND HOW TO REACH IT." By Joseph G. Richardson, M.D., Professor of Hygiene in the University of Pennsylvania, etc.—one of the series of "American Health Primers," published by Messrs. Lindsay & Blakiston, Philadelphia—has received the unusual, but, withal, deserved compliment of a translation into French. Published by Asselin et Cie., Paris.

It is the first American work on Hygiene, so far as we are informed, which has been so honored.

ARCHIVES OF PEDIATRICS, A MONTHLY JOURNAL DEVOTED TO THE DISEASES OF INFANTS AND CHILDREN. Edited by William Perry Watson, A. M., M. D., Physician for Diseases of Children to the Central Dispensary, and Assistant to Christ Hospital, Jersey City, N. J. Vol. 1, No. 1., pp. 64, octavo. A chief feature of this new periodical is that it

"Is the only medical journal in the English language published exclusively in the interest of the medical profession, *i. e., without any advertisements*, and if the profession will support this desirable movement none will be accepted while under its present management."

Its better purpose is stated in its title, and the list of collaborators on the cover: Drs. J. Lewis Smith, J. M. Keating, F. Forchheimer, M. P. Hatfield, H. D. Ingraham, I. P. Oliver, Edward Birch, W. T. Plant and Jerome Walker in the United States, and Drs. J. F. Goodhart, London; James Finlayson, Glasgow; Henry Ashby, Manchester, and A. D. Blackader, Montreal. These names give assurance that it will not be lacking in acceptable material, and, it is sincerely to be hoped, such a prompt and substantial subscription list as will eminently sustain the new venture, without the collateral benefit of a good advertising patronage. The contributors to the present number are: William T. Plant, M. D., on Convulsions; D. C. Cocks, A. M., M. D., on Tracheotomy; Louis Starr, M. D., Chronic Intestinal Catarrh; W. P. Northrup, A. M., M. D.. Clinical Memoranda on Expiratory Dyspnœa, &c. Besides which there is an interesting excerpt from various sources, of practical importance to all physicians. $3.00 per annum in advance. Jersey City, N. J.

SUICIDE: HISTORY OF THE PENAL LAWS RELATING TO IT IN THEIR LEGAL, SOCIAL, MORAL AND RELIGIOUS ASPECTS, IN ANCIENT AND MODERN TIMES. By R. S. Guernsey, of the New York Bar. New York: L. K. Strouse & Co.

This is a substantial pamphlet of forty-six pages, giving a great deal of information in a condensed form, curious and interesting to the general reader, and particularly useful to life insurance companies and lawyers.

TRANSACTIONS OF THE N. Y. MEDICO-CHIRURGICAL SOCIETY, 1882.

This is a well gotten up pamphlet of 128 pages, which contains reports, papers and discussions on several subjects of practical importance in medicine and surgery, by the most distinguished homœopathic physicians of New York and Brooklyn, and with a degree of freedom in criticism which shows that they do not restrict themselves to Hahnemannism as taught in the "Organon." On the contrary, according to Dr.

E. P. Fowler, in his presidential address: "Any doctrine teaching that diseases and the actions of drugs or poisons are abstract entities or non-entities, belongs to the mythology or fairy tales of medical history, far away from the known facts of physiology." Moreover, he credits Paracelsus and Stahl with the "philosophy" upon which Hahnemann founded his theory of abstract entities, and submits that it "would more nearly accord with the results of recent physiological research to consider disease as consisting of natural physiological processes, which give discomfort, and are destructive because they are unsuited to the habits of the organism in which they occur." This explanation of homœopathy by the President of the Society was allowed to stand unchallenged; it elicited no discussion, and may therefore inferentially be regarded as the accepted doctrine of the most advanced homœopathists at the present time. In the treatment of disease, and in surgical practice, especially, the departure is equally significant. Even the doctrine of similars is evidently losing its hold, while in the matter of dose, the "spirit-like *dynamis*" has for the most part given way to tangible drugs.

SMITHSONIAN REPORTS for 1880 and 1881, pp. 782 and 851, are both volumes of much interest, comprising an account of the operations and condition of the institution, with the statistics of the collections, exchanges, etc., by Professor Baird, the Secretary; the Reports of the Executive Committee, exhibiting in detail the financial affairs, and a general appendix comprehending a record of recent progress in the principal departments of science and special memoirs, original and selected, of interest to all who are interested in scientific progress. In the volume for 1880, under the note on *The Toner Lectures*, by the Secretary, special notice is made of Col. Waring's lecture on the Sanitary Drainage of Washington, wherein Holland is cited as an example for imitation in regard to the mud-flats of the Potomac. Embankments and bulkheads are recommended to hold the ground at its present level, to be drained by artificial power to a sufficient depth to secure the same result as to dryness as would be secured by filling it with earth. This, he holds, would substitute a dry and pleasant meadow for the present noisome mud-flats; would be economical, simple, and practically equivalent to raising the whole city six or

eight feet above its present level, and give it high and dry ground to the shore of a clear running stream on each side. His conclusions are summed up as follows:

1. The flats and marshes to be reclaimed by embanking and pumping.

2. The discharge of the lateral streams and storm-water sewers to be carried beyond these defenses and delivered into the main channel of the river.

3. The complete underdraining or subsoil drainage of the site of the city.

4. The separate removal of the foul drainage.

5. The abolition of privy vaults and cesspools and the complete reformation of the drainage of the interior of houses.

In the volume for 1881, the Secretary, under the note on Medical Collection, specially refers to the collection of pharmacopæias by Dr. J. M. Flint, U. S. N.—particularly noticed in our review of Surgeon-General Wales' Report (vol. xi, p 573). *Bacteria*, in the report on Botany, by Prof. W. G. Farlow, in this volume, is also an excellent condensation of all that has been written of value on the subject; and the collection of *Foods* is referred to as a subject of increasing interest. There are 951 specimens now in the Museum—225 from China, 516 from the Indians of North America, and 210 preparations of marine foods, gathered in connection with the fisheries exhibit. Messrs. H. K. & F. B. Thurber & Co., of New York, have undertaken, in connection with this department, to prepare for the Museum, without charge, a full exhibition of the food-substances handled in the grocery trade of the United States.

OBITUARY.

DR. ELISHA HARRIS, Secretary of the State Board of Health, died at the Delavan House, in Albany, January 31, 1884, after an illness of but four days' duration. The cause of death was peritonitis. Dr. Harris, who was well known wherever modern sanitation has made progress, was born in Westminster, Vt., March 5, 1824. After a common-school education in his native town, in 1837 he became an academical student of Dr. S. B. Woolworth, late Secretary of the State Board of Regents

of the University of the State of New York. During ten years of his life spent as teacher, student, and farm assistant to his father, he pursued his medical studies, and finally was graduated from the College of Physicians and Surgeons, New York, in 1849. Lafayette College subsequently conferred upon him the honorary title of Master of Arts. Soon after beginning the practice of medicine, he married, in the autumn of 1849, the only daughter of the Rev. Dr. Josiah B. Andrews. She died in 1867, leaving no children, and from the date of her death Dr. Harris gave all his time to the public service, in various capacities.

Dr. Harris' first entrance into public service was in 1855, when he was made Superintendent and Physician-in-Chief of the Quarantine Hospitals at Staten Island. He was active in the prevention of the spread of yellow fever from Fort Hamilton and Bay Ridge in 1856. To him was intrusted in 1859 the construction of a floating hospital, to be anchored below the Narrows, after the destruction of the quarantine hospital on Staten Island. He was a member of the Committee on Quarantine Regulations, of the National Quarantine and Sanitary Convention, whose report before the Convention in Boston, 1860, comprehends all the essential details of the present quarantine establishment of New York. When the war of the rebellion broke out, Dr. Harris, in connection with the Rev. Dr. Henry C. Bellows and others, became interested in the National Sanitary Commission, and he was for nearly five years a Sanitary Commissioner. The railway ambulance was exclusively his device, and proved of such value that, in 1867, at the Exposition Universelle in Paris, he was awarded a bronze medal. A silver medal was given him for the same ambulance by the Société des Secours aux Blessés. The ambulance was also adopted and used by the Prussian army in the Franco-Prussian war. The system of a national record of the deaths and burials of soldiers was also devised by him and adopted by the War Department.

At the close of the war he was intrusted with the collection of the sanitary history of the war, which was published in several volumes, entitled, "Sanitary Memoirs of the War."

After this Dr. Harris again turned his attention to the sanitary conditions and needs of New York. As a volun-

tary work, he supervised a sanitary survey of the city. The results of this were published by the Appletons, as a report on the sanitary condition and wants of the city. It was a work of great value to sanitary science, as well as to the metropolis itself. He entered the service of the Metropolitan Board of Health three days after its organization, March 5, 1865, the same day on which the Secretary of the present Board, Col. Emmons Clark, received his original appointment. His associates on the Board were Drs. James Crane, Willard Parker, John O. Stone and John Swinburne, and Jackson S. Schultz. The ex-officio members were Thomas C. Acton, John G. Bergen, Joseph S. Bosworth and Benjamin F. Manierre. Dr. Harris then held the position of Registrar of Records. In 1869, when E. B. Dalton, the first Sanitary Superintendent of the city, resigned, Dr. Harris was appointed as his successor, but was legislated out of office in 1870, with the adoption of the new charter. In 1873 he was appointed Registrar of Vital Statistics, and he retained that position until January, 1876, when he was again virtually legislated out of office—the Board of Estimate and Apportionment having consolidated the Bureau of Vital Statistics and the Sanitary Bureau, and extinguished the office of Registrar of Records, whose work is now performed by Dr. John T. Nagle in the department of the Sanitary Superintendent. When Dr. Harris was first appointed to the office of Registrar, in 1866, the records were in a very bad condition and wholly unreliable. Order was created out of chaos, and the system now in use was chiefly devised by him.

One of the greatest works for the benefit of the people of the city, in which Dr. Harris was engaged, was the first thorough tenement-house survey, known as the Sanitary Survey of 1869. It was so complete that the blanks filled in by the Inspectors were bound, and they are to-day preserved and esteemed as one of the most precious series of records in the possession of the Department. It was the beginning of the tenement-house reform, which is yet far from being complete. Dr. Harris was also actively engaged in fighting the epidemic of relapsing fever in 1870, when, there being no hospitals for contagious diseases, a thorough system of disinfecting was made necessary. To him also is due much credit for the first steps taken in establishing the system of

public vaccination. This was in 1869, and about 50 physicians in that year vaccinated between 50,000 and 60,000 persons. He also did efficient work during the cholera epidemic of 1866-7, though he modestly allowed the executive honors of that fight to rest with Dr. Dalton, whose most efficient aid he was at the time. Dr. Harris' uniform politeness, courtesy and urbanity while connected with the Health Department won for him the title of "the Chesterfield of the Department."

When, in 1880, the Legislature organized the State Board of Health, Dr. Harris was made one of the three Commissioners, and he was unamimously elected Secretary and State Superintendent of Vital Statistics. These positions he held at the time of his death. The organization of the entire service was due in great part to his ability as an executive officer. He was also instrumental in the organization of the American Public Health Association, of which he was for several years Secretary, and in 1879, President. Into the work of this association he entered with his whole soul, devoting all the time he could spare to the advancement of its aims and interests.

Dr. Harris was also widely known as a philanthropist. He was for many years identified with the Prison Association, for the care and reformation of discharged convicts. He was its Corresponding Secretary from 1872 to 1880, and a member of the Executive Committee at the time of his death. He was made State Agent for Discharged Convicts, when that office was created in 1880. He served for a year and a half in organizing the system of State philanthropic work done by that officer.

Dr. Harris was also identified with the Association for Improving the Condition of the Poor, and was a member of the County Medical Society, the New York Academy of Medicine, the Physicians' Mutual Aid Association, the Society for the Relief of Orphans and Widows of Medical Men, the *Medical Journal* Association, and the Public Health Association of New York. He was also an active or honorary member of various other associations and societies in this country and Europe. He was consulting physician to the county branch of the Nursery and Child's Hospital. He was a voluminous writer of works on sanitary and philanthropic subjects, and also on questions relating to vital statistics.

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THE ART AND SCIENCE OF SANITATION.

Abstract of Annual Address before the Eleventh Annual Session of the American Public Health Association, at Detroit, Mich., Nov. 13, 1883. By E. M. HUNT, M.D., President.

About eleven years ago, on a September day, a few gentlemen met in the parlor of Ocean Hotel, at Long Branch, and perfected the organization of the American Public Health Association. With its parentage in the Empire State and its nativity in New Jersey, it added the strength of the one to the true blue earnestness of the other, and made its grand outlook upon the ocean, the symbol of its breadth of purpose and grandeur of results.

It is often said of men that they builded better than they knew, but these men knew much of what they were attempting to build. They were neither novices nor adventurers. They had caught the first gleaming of an opening light as it dawned over the mountain tops, and although it were but twilight, they knew that it meant the daylight of a new science and of a progressive art. Some of them had been members of quarantine conventions, which had discussed great questions of national and international protection. Others had had large experience in the disabilities of city life, and had witnessed the

sad destructiveness of preventable disease. They already had a Stephen, full of spirit and power, an Elisha, wrapped in the mantle of prophetic foresight, a Rauch, with good sanitary substance, a White and a Snow, fit standard-bearers of a science and an art whose purpose is that cleanliness which well befits personal purity. They had been joined by a goodly company of aids, and the chariot of Israel and the horsemen thereof were equipped as men valiant for truth and determined upon a vigorous advance. If you will read over carefully the twenty-six subjects they assigned to committees, and the names of those whom they chose to make reports, you will find a breadth of conception worthy of the men and of their cause, as also far in advance of the professional and public sentiment of their day.

No ordinary work marked the earlier meetings of this Association. They were planned with deliberate forethought. They were executed and adjusted with careful adaptation to periods and locality. The claims of scientific research, the testimony of expert investigation and analysis of the facts of sanitation were not overlooked. Popular addresses from studious and zealous amateurs, and the full publication of a public press whose audience and influence were directly secured, made it worth while for the great populace to bend a listening ear. I for one cannot tell you how heartily grateful I feel in the presence of those men who with hand-work, head-work, heart-work and purse-work, moved steadily along in the great effort to disenthrall a nation from the shackles of physical insanity.

Since the earlier years we have passed through perils as well as had happy experiences.

The Richmond meeting met issues and had results which, whatever may betide to individuals or boards, can never have its blessings effaced. The gratitude of Memphis is something more than the response of an Egyptian oracle. The Southern seaboard and the Valley of the Mississippi, amid all the theories about jurisdiction, smile at each other with thanks over the practical protection of the coast and the inland quarantine they were able to secure.

Nashville grasped our hands, while its citizens enrolled their names by the hundred for our aid, and New Orleans repeated the welcome, while it pointed to the wonder-working results of its voluntary sanitary administration.

Savannah borrowed a zeal and activity from our meeting which are now aiding its citizens in reform. Indianapolis enabled us to change from a merely popular convention to an association guarding against promiscuous rule, and yet asserting that no creed, no occupation, no sex, no favoritism should exclude any one who was certified as having done good, honest, efficient work in this specific field.

We seek a catholicity as broad as charity, but select as character and knowledge ought to be, and putting a new pillar of strength at our portals, we propose to adorn it with richer trophies of science and to entwine it with the productive achievements of art.

During our brief existence, what a change has been wrought in the status of our work, and in the breadth and tillage of the field for our operations. To recount it, would, of itself, occupy the hour. The great awakening of public sentiment is such that it has become our duty to sift the superficial from the substantial, to guard against crude and callow advice, to cry out for a zeal according to knowledge on the part of sanitary reformers, and to see to it that the science is not damaged by the dabblings of too hasty and incongruous efforts.

But why, we may well inquire, why is it that just now, in the nineteenth century of the world, there has been this great awakening and advance.

Surely parts of the world have been full of people before, and cities have crowded their populations into close proximity.

Sickness, pestilence and death and attempts to avert them are no new things. The classic Herodotus has given us a description of the Grecian plague, as graphic and as touching as any of the later descriptions of cholera and yellow fever. Hippocrates, Thucydides, Hecker and Bascom have written details of epidemics as appalling as any that have visited the more modern world. The Roman satirists depicted in scathing metre the physical degradations of the times. Those of the middle ages reveled amid terror, superstition and despair, and hurried their helpless victims by families and by streets into promiscuous graves. Yet Greece and Rome were not lands of ignorance. In the middle ages intelligence and observation were not dead, nor was there an absence of earnest desire after some elixir of life. "The Regimen Sanitatis Salerni," or the

Code of Salerno, between 1100 and 1600, had scores of editions and appeared in various languages. If you will judge of the spirit of inquiry of the day by some of the subjects of the dissertations of Boerhaave, such as "De Distinctione Mentis a Corpore," or that remarkable essay, "De Comparando Certo in Physicis," or his latest thèsis, "De Honore Medici Servitute," in which he represents the physician as the servant of nature, whose activity he is to awaken and direct, you will see that it was not the absence of a longing after the true light that made the results of investigation so meagre or ill-defined.

De Foe (1661–1731) wrote of the plague in an age when England was not unlearned or unimpressed with the horrors of the siege of death. [See American Encyclopedia.]

Men were superstitious, not because there was no learning, but because superstition is always the relapse of a faith that is blind when the only other alternative is a dogmatism which is the offspring of a reason that is deaf and dumb to the meaning of events.

If you would know the impression made by disease upon the sentiments of ancient society, read Hecker's Epidemics and trace the devotees by thousands as they hastened to votive altars or erected churches to propitiate some imaginary deity, or by magnificent statues commemorated their deliverance from the visitations of the pestilence.

In many an ancient city are still to be seen these testimonies that the people were not unimpressed or unaffected by the perils of disease, and that they were intensely inquisitive as to the methods of deliverance.

The village of Oberammergau, in the Bavarian Highlands, and the "Passion Play" (first performed in 1634) which has made its name familiar, is but an illustration of the awe and the intensity of desire which seized upon men to be free from the very evils which were the results of their own ignorant devices. "The 'Passion Play' originated in an outbreak of what was called plague, though it was probably typhus fever. The malady was imported by a peasant who came to visit some relations, and it resulted in the death of eighty persons. This caused so great a panic that the superstitious inhabitants determined to institute a passion play, which was to be repeated every ten years if the plague ceased. As this took some time

to organize, the plague had time to wear itself out before the performances were completed, and they have consequently been repeated every ten years." (London *Lancet*, New York edition, November, 1880, page 473.) In English history we ever and anon trace, in civil laws, in blue book records, in curfew orders, in household inspections, and in efforts amid actual visitations, this reaching out of desire for a greater familiarity with the conservative conditions of human life. So prominent were the evils of insanitary conditions that Sir John Harrington, a great favorite with his godmother, Queen Elizabeth, who was "temporarily banished from her court for writing a work upon an objectionable theme, entitled the 'Metamorphosis of Ajax,'" nevertheless had his book pass rapidly through three editions. If you will turn to the word "jakes" in our Worcester's Dictionary you will find the following note: "Sir John Harrington in 1596 published his celebrated tract called the 'Metamorphosis of Ajax' (pronounced a jakes), by which he meant the improvement of a jakes, or necessary, by forming it into what we now call a water-closet, of which Sir John was clearly the inventor."

It is but an example of the immense stir of earlier days over remedies for existing evils, only little shreds of which remain, because there was neither science nor art, nor practical utility at the bottom of the numberless devices for delivering society from the diseases of which their ignorance, misconception and misconstruction were the authors.

But how utterly inadequate was every attempt that could be made, and how imperfect every conception as to the essential laws of human life and the recondite conditions of its existence.

When the Greek said *gnothi seauton* he did not even mean a knowledge of the human framework.

The grove of Plato's academy and the lyceum of Aristotle were employed about philosophies that threw no rays on the problems of physical life. The only redeeming fact was that somehow experience had taught that games and athletic exercises made a noble race. In the absence of all other light, we must not be too censorious, because Lycurgus thought that feeble children, for the strength of the race, had better be helped to die, and physical prowess be secured by the laws of heredity.

It was only when progress in other sciences and arts made it possible to apply these to the interests of life that men began to see the wide vista opening in this direction.

As under the light of modern knowledge one after another of the sciences began to be developed and to spread out from its general classification into a branch by itself, it was soon apparent that these admitted of application to health and life.

The sciences and arts have no higher possibilities than such as aim at the bettering of human conditions. This always means to teach men how to live, and that always includes the best physical interests of humanity. To know perfectly the law of human life, to know how so to conserve that law as to secure to it its normal conditions within itself, and to abate or prevent such environment as shall jeopard it, that is the ultima thule of the sciences. * * *

Is not every science and every art bringing its gifts, and its graces, too, and in exuberant profusion placing them around and about us, and pointing out the fact that they bear on life? The materials come faster than those for the building of the temple of Solomon. All Sheba is here with her gifts. No wonder that every neophyte starts to build while the most skillful are appalled for fear of a chaos.

Yet there are master workmen, and skilled aids are multiplying, and this grand material shall be arranged for the welfare of humanity. * * *

The best chance of recovery is often a treatment that is mostly hygienic. Thus the new science not only has its sphere in the treatment of health, but in the study of that series of laws which relates to abnormal conditions and indicates what hygienic adjustments have to be made in order to retrace our way back to the sphere in which the original forces of nature can have their full play.

Thus many a physician finds he has to be a sanitarian because he wants to be a good physician.

Not a few noble minds are much disturbed to know whether hygiene is a science, a philosophy or an art. Let such turn to Quetelet, as he asks whether statistics is an art or a science. Before replying, I will, in my turn, ask which was botany at its birth, an art or a science? * * *

How defective were the first inventions of the vegetable

kingdom, even under the idea of an art, and how little was it considered that botany would one day become constituted a science! Who dreamed then of the ingenious and profound classification since created, of vegetable anatomy, which should initiate us in the most intimate details of the structure of plants, and of physiology, which reveals to us the mysterious phenomena of their development and their reproduction!

What for their part were mineralogy, zoology, and even astronomy? A science before presenting itself in its true character is compelled to undergo different phases.

All sciences of observation at their commencement were arts, for they were confined to grouping, in a more or less successful manner, collections of facts belonging to a particular order of things; and it is by the comparison and the study of these facts that they afterwards become elevated to the rank in which we see them shine in the present day. * * *

I do not think, my fellow-workers, that we need trouble ourselves much in finding out whether we have a science, when to its investigation many of the ablest students, explorers, classifiers and analyzers have given so minute and continued attention.

Parkes, Petinkoffer, Pasteur, Simon, Farr and Huxley will perchance rank as knowing something about what makes a science.

The Society for the Encouragement of Original Research in Sanitary Science in Great Britain, with John Simon, John Tyndall, John Burdon Sanderson and George Buchanan as its Scientific Committee, probably knows whether there is any outlook in this direction.

Our chief question as an association, it seems to me is, *Are we using*, among other efforts, scientific methods to catch up and keep up with the science? That is the rub. * * *

Be assured that this work we are humbly attempting has more of physiology, psychology, biology and all the other "ologies" of air, heat, electricity, all mechanics and all forces of nature, of genius and skill, and all the appliances of art, than has ever yet dawned upon the average conception of the citizen. It is a service which invites the patient industry and the well-poised enthusiasm of the thinker, the investigator, the artisan and the true student in almost every department of practical inquiry.

To its place as a science, to its practice as a high art, it adds its claims as a philanthropy. * * *

It takes hold of the affections as well as of the intellect and skill, and appeals to those heart sentiments which we mean when we speak of whole-souled earnestness for the welfare of our fellow-men, and heartiness such as takes our yoke-fellow by the hand, lifts the burden of avoidable sickness from off the shoulders of whole communities, and enjoys doing it not only because it is scientific and practical, but because *vir* means man and virtue means manliness, and manliness means hearty, whole-souled endeavor to limit human woe and sorrow, and to unfurl the banner of a skilled philanthropy.

Aye, it is even more than this. The aspiration and inspiration are divine as well as human. The work is not a preachment, but a life, not piety, but religion, asserting much for primary beliefs and intuitions and rebinding us to the Creator. Amid these studies and their outcome are the most wonderful exhibition of infinite *plan*, of *infinite working*, and of an infinite loving kindness, too. * * *

Thus, gentlemen, I think we are not presumptuous when we claim that to-day we have a pursuit for which science, art, philosophy and faith have planted each their chief corners, and that we are to rear a structure that shall be living stones polished after the similitude of a palace and adorned with gifts and graces that are the insignia of all that life, liberty and true happiness mean.

We cannot be too profoundly impressed with the *largeness* of our subject when we speak of State medicine. Concentration of attention on a few popular themes is quite too apt to narrow our vision, and to lead us to overlook the vastness of area which it includes.

It is not enough that we talk of food-supply, "materia alimentaria" instead of materia medica, of water supply, of pure air, of heating and ventilation, and end up almost every subject with an indictment of sewer gas and a crack at the plumber. It is well, indeed, when attempting to deal with any one of these, that it be investigated thoroughly, and with fixedness and concentration of purpose. But it is also needful that an organization like this should recognize the boundaries of its science, the extent of its art, and so map out the great sphere of its operations.

Our starting point is the one syllable that means more than all else that the world contains: *It is* LIFE. What it is, what are the conditions of its existence, of its normal being, of its highest health; that is the one side, and that means *Law* in its exactest conceptions, its most definite declarations, its most accurate conservation, its Nexus the Creator, its circumference the creation.

On the other side, it is Death—what tends to it, what interrupts it, what counteracts all the forces that imperil human existence.

The physician stands between these, the hygienist in front of both. Forethought is generally better than afterthought. He anticipates. He is preventive not merely in the sense in which the physician treats already existing disease, but in a sense far more explorative and fundamental.

Because it is the study of Life, with a view to a knowledge of disturbing forces, in order to remove or limit them *before* they come into operation, it has an outreach that is singularly sublime in its vastness. It takes hold of Life and its profundities with a more down-reaching grip than that of the treater of disease. It is because of this that *ab initio* it summons the workers from dozens of departments, and hails them, not as aids, addenda, ornaments, or patrons, but as *elements* which alike concern foundation and superstructure.

It is for this reason that behind pathology or histology, we must get back into all that biology means, including not only comparative zoology, but vegetable physiology, and the study of that entire environment which affects life. Hence we already find many workers who, with the realization of this, are peering into life in its minutest forms, and recording, not merely by word of mouth or by stroke of pen, but by the micro-photograph, the behavior of life in its infinitesimal morphology, and the relation of matter thereto. Beginning thus with such a *watch-word*, where can you stop your watching and inquisitive circumspection?

All natural law must be asked to define itself in the statute book of such a physiographer; all variations must be asked to record the law of their variation; all disturbing forces must reveal the method of their madness. The processes of devitalization must be known as definitely as vitality, the law of

disease as precisely as that of law-abiding ease, the law of death as exhaustively as that of life. Do we not need, then, to tell each other that this means, more than any other science on the earth can mean, that such a science, such a group of sciences, means more in art and in diversity of practical application than any other art of the universe can mean, since no science can have so many arts and so much of needed practice as that which tells and teaches the world about life, of which health is the patron saint and happiness the earthly crown of rejoicing? Hence how have the subjects multiplied upon us, and not less a sense of the need of deeper insights.

Air has to be searched, not merely for constituency beyond its chemical forces and the invisible plants and animals it contains, but for the laws of its circulation and diffusion in house, cellar, wall, along surfaces, and in pipes, with an accuracy of experiment never dreamed of twenty years ago. Not every current travels through the pipe made for it, and many a ventilator is either only a vent or its *cowl* the hood of an effigy.

Heat, as to its laws amid our furnaces of affliction and all the machinery of modern apparatus, and in its production in the body and in the house, is a specialty quite different from the study of the sun, or from the definition of it as a mode of motion.

Water is more ancient than the flood, but its bearing on life is not yet settled. We have been glad of what the chemists have done for us, but it is R. Angus Smith that is just telling us that examinations by Koch's method are "far more important than the chemical," and that "chemists must prepare for a new condition of things." (p. 345.)

Light, as to its agencies on organic matter, and the effects of its exclusion from cities and all underground structures, is yet a twilight. Cleanliness and filth are old words, but dirt has its secrets deeper than the dirt philosophy has ever fathomed. We have made some grand vital attainments as to the uses of food and its conversions, but its adaptations to conditions are yet demanding close analysis.

How sanitary training, teaching and practice shall enter into education is a theme on whose determination the destiny of entire races is awaiting.

The vital movements of population, and how to deal with all

statistics so as to conserve the vital interests of the nation, is yet undetermined.

Political economy and race vitality, which means national existence as demanding health administration, offer a field as broad as that of medical jurisprudence. Both patriotism and sociology have direct claims upon us.

The rights of labor, and the common interests of labor and capital, must yet learn from us certain inalienable rights of all operatives, as to factories, as to noxious trades, as to exposures to dust, to smoke, and injurious gases, and the abatement of effluvium nuisances.

A sound sanitary jurisprudence has not yet been elaborated, and the various laws and contradictory precedents which jostle about between legislative enactments and judicial controversies need settlement.

It is to be borne in mind that some of the work to be investigated, and some of the sanitary problems to be solved, are distinctly American. While we can never too highly appreciate the debt of gratitude we owe to Great Britain, to Germany, to France, to Switzerland and Italy, yet there are studies which are distinctly our own.

Yellow fever and cholera infantum are specimens of diseases which, although having modes of investigation allied to those of others, have yet a historical and a clinical study which requires specific analysis.

As to many of the contagions of the old world, there is reason to believe that we have not as yet fully reckoned the influence of the great change which the soil, climate and other conditions of the Western Hemisphere involve.

Malaria, as it appears in our own country, as its types seem almost to shade off into typhoid or yellow fever, may be studied, but cannot be settled by the facts which are reported from the Ganges, Salisbury and Ely.

The capacity of our rivers to dispose of sewage cannot be determined by a reference to the sluggish Thames, or the Seine, or the Tiber.

All these may give some information, but there is a wonderful study of adjustment and modification of truth by localities, climate, etc. Some food adulterations are quite American, and we cannot learn all from abroad as to canned fruits and

vegetables, potted meats and condensed milk. Some of our experiences as to heating and ventilation show that we have not made due allowance for our modes of building, our climate and the various incidents of changed American life. Emigration and inter-State immigration are great disturbing factors as to our vital statistics, and the field of study is quite different from that of lands where standing armies exist. It is a great field, a most important field in its bearing upon social facts and indications in a civilization distinctly American.

The working sanitarian of to-day proposes for himself three spheres :

He is (a) either an original investigator, or (b) a collector and sifter of the alleged facts bearing on the preservation of life according to the laws of evidence, or (c) such a practitioner in the administration and application of sanitary methods and experience as makes him efficient as a health officer.

Seldom do we find all these capacities in one man. But in each of these there is an opportunity for the highest attainments, and for great service to hygiene and to mankind.

In the line of original investigation no field has of late years been so prominent and so productive of working hypotheses, theories and results, as that of epidemiology.

It has not only sought for the causes of those recognized epidemics which from time to time through the ages have ravaged continents and oceans, but has been able to trace to a parasitic or specific origin many diseases once regarded as constitutional. Just a brief insight into the extending scope of the inquiry is afforded by a *conversazione* which took place at the house of Dr. George Buchanan, F.R.S., the head of the Local Government Department of Health, within a year (October 18, 1882).

Dr. Cobbold exhibited preparations of the ova and living ciliated embryos of Billiariza hacmatobia.

The embryos were seen making vigorous movements within the firm outer shell of the ovum, which finally ruptured and allowed them to escape. The specimens were obtained from a patient who had contracted endemic hæmaturia while in Egypt. Dr. Klein also demonstrated specimens of bacillus tuberculosis in the sputum and lung from tuberculous patients; from the lung of a cow suffering from bovine tuberculosis

(Perisacht), of the bacilli of anthrax and septicæmia, of the bacilli met with in the Welbec and Nottingham cases of ham poisoning, and the micrococci present in the lymphatics in bovine variola, and the blood and liver of patients suffering from infantile diarrhea.

A section through the tongue from a case of Actinomiyces bovis also showed very beautifully the stellate masses of fungus surrounded by a deeply stained layer of inflammatory exudation, containing leucocytes. Specimens of the embryo filaria sanguinaria hominis from the blood of a patient suffering from chyluria, and from the Chinese mosquito, were exhibited by Dr. Stephen Mackenzie.

Examples of trichina spiralis in the muscles of a wild boar, of dracunculus embryos, of the micrococci of diphtheria, septicæmia, pyæmia, and ulcerative endocarditis, and of the ringworm fungus (trichophyton tonsurans) artificially cultivated, were shown by Drs. Bastian, Gibbs, Henderson, Mackenzie, and Mr. Malcolm Morris."—*London Lancet*, Jan., 1883, p. 80.

Or this description of the Laboratory of the Berlin Board of Health, in its pavilion at the Hygienic Exhibition now just closing. It says. " Here are to be found the different kinds of sterilizing apparatuses, the thermostate after d'Arsonval and Leitz's microphotographic apparatus. There are exhibited besides, specimens of all micro-organisms till now bred in pure cultures from the common penicilium up to the bacilli of anthrax, tuberculosis and farcy."

Here Dr. Robert Koch himself and his assistants are demonstrating in the most liberal manner the principles of their methods as described in the " Communications of the Board of Health."

Thus no longer need we trust to what might be the distorted vision or prejudiced views of individual observers, but can call upon them to reproduce what they have seen, that we may see also and then make our own synopsis of facts, and deductions therefrom.

Science and art are sure to advance when the " ipse dixit " vanishes, and numbers of competent witnesses are at hand to verify the observations made.

It is thus that this line of inquiry now takes the lead in that department which relates to the causation of disease and iden-

tifies so many diseases with the presence of "microscopic fungi."

This presence admits of various hypotheses in explanation. Beale calls the ever-growing fungus "the most universal of all kinds of living things," and speaks of it "as occurring wherever it finds its pabulum."

Those clinging to this view would regard it, as in its presence in disease, the indication of the diseased processes which have been set up, rather than as the incipient cause to the extent of constituting the malady.

Even such admit that the multiplication of the bacteria may, by the demands of ephemeral life, by its own metastatic processes, or by a mechanical clogging up of glands or ducts, determine the gravity of the disease. In this line of inquiry there is yet much to be explored. The transfer of harmless into virulent bacteria, the taming of the virulent into the benign; the conditions of its transfer so as to protect against disease; the various modes of destroying harmful bacteria in the system, in a word, all the study of the infinitesimal zoology of animalculæ and the infinitesimal botany natural to, or implanted in, the human being, is not this still a marvelous territory, open for wide investigation, dividing itself up into specialties in which any skilled observer is almost sure to elicit some new facts? Nor is the study of the causation of disease confined to this department.

The origin of diseases, their habitats, their conditions of propagation, the chemical, the mechanical, the atmospheric, the telluric influences which affect them, all come within the domain of this division.

The executive committee of this association has shown that it does not intend to forget its duty in that line of research, and so in the choice of malaria and in the papers it has invited, has at this meeting made good provision for those who labor in such a field.

We, perhaps, here have need of caution, since an overreaching may be a great misfortune to sanitary progress.

In the prominence given to the doctrine of the mycotic specificity of disease there is much danger that associated influences will be overlooked. This has been variously manifested in connection with epidemics or the occurrence of periodic fevers.

In the last epidemic of yellow fever there was more of a disposition than ever before to look upon the visitation as a winged pestilence or a stealthy intruder, which, after its arrival, did its deadly work in spite of surroundings, or quite independent of them. The doctrine of the epidemic constitution of the atmosphere was so far revived that many ignored the relations of filth to the actual progress of the disease.

In a trial the last year in Massachusetts, the doctrine of vegetative specificity was made to tell against the possibility of local origin, and expert sanitary witnesses for the defendant practically denied that vegetable decomposition, stagnant water and heat had any appreciable relation to malaria.

It cannot be said of any disease, proven to be dependent upon or associated with a specific infective particle, that its presence or virulence is independent of persons or surroundings.

Even where the seed is not indigenous and the sower who goes forth to sow is unseen, yet if it fall by the beaten wayside, or where there is no depth of earth, in the unfriendly soil of a pure life or a pure dwelling place, it perishes as surely as an invading army perishes without its commissariat.

These marshes and lowlands, amid moisture, vegetable decay, favoring temperature and other conditions of climate, cause an "organic vitiation" of the atmosphere. "This organic matter of exhalation is still one step removed from malaria; it is only the ground of malaria, the soil on which a malarial growth will propagate. Its decomposition is held to supply the means of fecundity to the germs of disease. In warm air, with excess of moisture, it may undergo a rapid and somewhat fetid decomposition. With a smaller proportion of moisture, or when it is rapidly absorbed with the moisture by diffusion into air of American dryness, it does not decompose so rapidly, but is likely to be absorbed by any hygroscopic substance with which the air containing it may come in contact." Now, in view of well established facts as to the influences of paludal localities, I submit that with differences of local surroundings, and with constant changes of surface and winds, it is not very obscure that the effect in some seasons is less than in others; that some places become malarial which once were not; that adjacent hill-tops are visited, or that there are all grades of inten-

sity, from the dumb chill to the intense remittent with symptoms well nigh typhoid.

Is it not erroneous to defend such a locality as not a cause of malaria, because, forsooth, it is claimed that some specific fungus must be wafted to the spot? All the more, because if this is so, that fungus is as sure to find its way to such a spot as what we call natural grass is sure to grow unsown on fertilized fields, and because it has not yet been shown that such plant life does not uniformly exist in such soils ready for exuberant growth when all the conditions essential to its productivity are reached.

Even granting a vegetative specificity to some diseases, note the fact "that variations in nutriment, in temperature, air-supply and stage of growth at which propagation takes place, may convert one of the most harmless of microphytes into one of the most deadly," and this conversion may take place on the spot.

Where the carcass is, thither are the eagles gathered together, and eagles though they be, where the food is wanting they perish as in a wilderness. All the more because we are constantly finding that there are great limitations to the destructiveness of infinitesimal life, and that it is only operative in certain quick stages of its changing and ascertainable development.

The old and well known facts as to the preparing of a system for inoculation, and the benignancy conferred on small-pox by it, is a standing evidence that soil sterilization within a man as well as about a man is a potent doctrine in connection with the prevention of epidemics; for to have an epidemic you must not only have the arrival of a seed, and its sprouting somewhere or in some few bodies, but such general receptivity or culture, as makes it to prevail among the people.

On such a point the recent testimonies of the Cholera Commission of the German Empire, which met in 1873, and within a year ended its labors, is worthy of great note. It has been in hands of close observers during the ten years that have marked the great epoch of "germs," and yet what say Petinkoffer and even Heirsch, both believers in the specificity, and the latter believing much in the capacity of germs for making themselves a home. (See *Med. News*, March 24, 1883, page 331, and translation of Dr. Chamont.)

Petinkoffer says that "any one looking at the charts and observing the sharply defined limits of the localized epidemics, must come to the conclusion that mere intercourse with cholera cases or cholera-stricken localities had nothing to do with the spread, but that the most important part was played by the *locality itself* to which the disease germ was brought," and "that it always depends upon locality for *epidemic* development."

The report of Dr. Pistor, of Oppeln, as to the thirteen decided epidemics there, including 44,904 cases and 21,329 deaths, as stated by Heirsch in the sixth part of the report, lays remarkable stress on the fact that lines of railway are not exceptionally attacked; that it must find conditions favorable for its development, such as crowded and foul localities saturated with decomposing substances, and a condition of soil favoring decomposition.

The entire commission united in this summary: "Of all the measures which may be applied to the prevention and combating of cholera, those take the first place which have for their aim the improvement of general sanitary conditions; all specific measures against cholera will prove unavailing, unless we pay the strictest attention in inhabited places to the purifying of the soil from organic and easily putrefying refuse, to the drainage of the soil, to the constant flushing of the sewers, to the frequent emptying of cesspits, the complete doing away with previous cesspits, the careful inspection of dwellings, and closing those that are really hurtful, the provision of pure water, both for drinking and other domestic purposes, and the like. The commission expresses here the united opinion of all the most experienced physicians, when it says that the strictest attention to all the measures demanded by the public general hygiene offers the best protection not only against cholera, but against all other epidemic diseases." (Sanitary *Record*, December 15, 1882, page 247.)

Were you a king and did you know that unseen demons were in the air, and that no evil could betide until they alighted, and that all history and experience showed that they alighted and reveled to the destruction of life chiefly where filth and foulness abide, would it not be trifling to spend all the time on "doctrines of invisible devils" instead of joining Hercules, and

cleaning up the filthiest part of the Kingdom of Augeas? So let not any theory of parapetic specificity obscure the fact that locality is a factor which can neither be ignored or depreciated.

It is well that the advance workers in etiology and the advanced believers in the significance of infective particles with a specificity of their own, are not the ones who unsettle courts and juries, and becloud the muddled public by what amounts to this: The germs of disease come floating from afar; therefore don't spend your time in taking care of yourself or of local conditions, for you can do nothing until you get on the scent of the microphytes.

All honor to those who are on the scent, all pity for those who will retard the progress of sanitary and of State medicine and of sanito-legal jurisprudence by this worse than legal casuistry.

Any one who will read the views even of Heirsch, as given in connection with the report of the Cholera Commission, will, I think, see that even he, while giving prominence to the infective particle as the chief factor, does not set aside locality as far as do some of our modern witness experts.

It was not to be supposed that Sir Joseph Fayrer, with an experience almost confined to India, and as inclining to new hypotheses as to cholera, typhoid fever, etc., should let the remittent fevers of India go without a similar application of his doctrine. In reply to his address of November, 1879, a reviewer has well said that his observations, as detailed by himself, "do not admit of comparision in their precision and accuracy of detail with the observation on which the contrary conclusions have been formulated. It is not to be forgotten that an overwhelming majority of Indian observers concur with nglish epidemiologists."

The question has obtained prominence from the accident of certain official relations of the Indian dissentients, not from the scientific value of their doubts (see *London Lancet*, March, 1880, and July 2, 1882). But be it remembered that, however important and fundamental to preventive medicine is an inquiry into the causation of disease, in order to its prevention, that nevertheless progress in sanitation is possible, independent of this knowledge.

Even in diseases believed to have a specific contagion, we

will practically succeed first in looking after the conditions of its nutrition.

"These," says Petinkoffer, "we are likely to discover long before the germ itself," just as sugar was recognized in grape-must and beer-wort as the necessary substratum for alcoholic fermentation long before the part played by the ferment and fungus was understood. (p. 246).

We do not yet know the life history of the vaccine vesicle, and yet this has not prevented the application of the first and perhaps greatest boon in the direction of dealing with epidemics.

There are multitudes of questions, both scientific, statistical, and practical, and numberless derivations from analyzed experience which go to make up the practice of hygiene, which are very independent of a technical knowledge of causation. Even original investigation is far from being confined to the sphere of etiology.

The man who by 10,000 measurements in school life determines the law of growth and the modifying influences, or the man who tests the resisting power of 1,000 tubes, their proper calibre, the flow of air currents through the pipes, the influence of siphonage and all that relates to them as carriers of liquids, and so arrives at a law of direction, is also a skilled and original investigator.

These are but examples of hundreds of lines in which close observation is needed, and in which those who are busy are serving the interests of preventive and protective hygiene.

That class of sanitarians which has capacity for collecting and sifting, men omnivorous in a specialty, of wide reading, of editorial insight, who can apply the magnet which will separate the true steel from the conglomerate mass, who can arrange and classify, and with expert judicial mind can weigh the evidence and then state it with clean, clear-cut, logical analysis, are no less valuable to the progress of our science and of our art.

Of the two this is a more difficult and a higher attainment. In laboratory work there are facilities, there are prescribed methods, and there is a chance for special technic drill and expertness which ordinary diligence, good advantages and extraordinary industry are pretty sure to command.

But the historical student has to group his facts so as to get at the deeper philosophy of history, and where it is both a scientific and practical field, must be able to bring a training and maturity of judgment, a capacity for selection and logical deduction which demand a greater range of competency and that balance of all mental powers which does not mislead others because it is not misled itself. He must know what Taine means when he speaks of one as able to discover a fact and not an account of a fact, and what Buffon means when he calls an aptitude for patience a genius. This patience, this discernment and arrangement of facts, and reasoning therefrom, calls forth some of the highest forms of the practitioner of hygiene. It is related of an astronomer at Washington, that at a recent marriage reception he seemed somewhat absorbed, and being asked whether he had saluted the bride, on a negative answer his friend said: "Why do you delay?" "I have," said he, "no facts to communicate." We do not claim that social chat need abound in facts. But it were well if some of those ready to salute the bride whose name is Hygeia, had more facts to communicate such as in quality and in quantity answer to the laws of evidence. On his return from his first visit to England, some one is said to have asked Daniel Webster who was the ablest man to whom he listened in the House of Commons. His answer was, Sir Robert Peel. "As I entered," said he, "he was in the midst of a speech, and the first sentence I heard was, 'I now come to the onion seed.' He was discussing the budget of finance and unfolding the sources of revenues and the regulation of trade. And so he went on from one item to another with a precision of knowledge and an explicitness of detail that showed he had an intimate acquaintance with all the resources within the reach of the government, and knew how to adjust laws to the indications in hand." It is just so with the true sanitarian. He not only knows the seeds of disease, but how prolific they are, where they are disseminated, where they grow, and how to sterilize or isolate them. He is a master of facts in evidence and of details, and so is ready to estimate his part of the work. It is a sphere in which more are misled than any other, one of abundant writing of essays which are original only to their authors, of popular word pictures of existing evils, which often come from valuable

men of ready style and ready utterance, but which will not be very much needed as building material for the future edification of this association.

The third field, that of administration and the application of sanitary methods and experience, is vastly important and eminently practical. In some respects it requires a combination of qualities the most difficult of all. The sanitary officer needs, first of all, knowledge; such knowledge as generally only comes from the habits of a close student; and yet his duties are such as not much to favor this study. He must *know*; but, alas! because he knows, must exercise powers of self-restraint most tormenting. He looks around him, sees the situation, bad drainage, heaps of filth, bad domiciles and foul streets. Greater sources of physical degradation hidden from the world, glare out in his very presence; he knows all these mean sickness, shortened lives, now and then a pestilence, race deterioration, misery and chronic ill success, which will tell on population, on industry, on finance, on thrift, on the very perpetuity of government. His manhood, his philanthropy, his skill, his knowledge, his patriotism, everything that is good, clever and godlike in the man is summoned to zeal in this service. But, oh! how embarrassed; if he applies a tenth of the life-saving knowledge of which he is the modest possessor, he is sure to lose his own head. His expediency and his tact must be so cautious as to let the nine perish that he may not lose his chance for saving the tenth. How hard it is not to be radical when any jury of sanitary experts in the land would in one hour after due trial bring in a verdict that his moral heroism was saving all that is precious to the people and to the children which in the next generation are to be the nation.

If he confines himself to clearing up nose nuisances he will have a following and some applause when the stench ceases. If he ventures largely to prevent, he is himself prevented. Between politics and legislation and the unconscious ignorance which most men have of the practical possibilities of sanitary reform, as a personal, civic and national blessing, is he not between an upper and nether millstone? Or, if not, at least between Gerazim and Ebal—a little band only on Gerazim and the curses of Ebal loud and long?

The possibilities of embarrassment in this direction have

been made prominent for the last year or more. One hundred thousand munificent dollars to check epidemics, but not a cent to keep them from starving. Ten thousand for salary, travel and office expenses, when every member of a national board had said make all but $500 of it available for investigation into the causes of disease and the modes of conducting preventive and restrictive measures.

As an American citizen I felt far more humiliation from the sentiments of the Congressional Committee, and the debate in the House of Representatives, than from the temporary check given to national health administration.

America, with its grand progress in all material interests, has done so little to foster inquiry into the pervading evils which decimate and deteriorate population, that I was not prepared for responses to sentiments which involved the discouragement of all scientific inquiry into the causes of disease, and which not only crippled the hands, but impugned the motives of some of the noblest men who have given unselfish attention to this great interest.

Money enough to chase a pestilence, but not a cent to investigate its cause, or deal with diseases all over the broad land, is like washing hearses, buying coffins and hiring gravediggers, and mourning for the victims of small-pox, while Jenner is refused a pittance in order to prevent it. Be ready with sappers and miners, with lint and bandages, for the first report of an explosion in a coal mine, but close Sir Humphrey Davy's laboratory and proclaim his safety-lamp a wire-screen for the amusement of experimenters. Yet for all this we have no need to become discouraged. There are cities in the United States to-day where health administration, in spite of all embarrassments, has achieved results notable and grand, and over which health officers preside whose names and opinons are a power at home, whose presence here is an inspiration and assurance of success. There are township and village officers who are educating the people and giving tone to the popular sentiment. There are State Boards whose beneficent influence is felt in their own States and throughout the land. There is a public press, whose utterances in this behalf have been able and thoroughly encouraging.

There will be occasional reverses and disappointments; for

such a cause there is no law of strength without them. Pestilence itself becomes a sanitary measure. All these zigzag courses will not make a man give up his ship. Nowadays we have enough old, experienced pilots to know whither we are sailing. We are progressive and aggressive because right, because backed by a science and an art able to certify themselves, and because there are means both of technical and popular enlightenment, which voice and pen and book and press will not fail to use.

But we should have great patience. It has truly been said that "the rapid progress of sanitary and preventive medicine during the last twenty-five years has not been from dawn, but almost from absolute darkness into daylight." It is not to be expected that there should always be settled convictions or the apparatus for their application.

The whole subject of sanitary legislation is so new to the courts that, leaving out the crudities of legislation, law has to receive fresh interpretations by judges, and precedents have to be secured by the moulding pressure of events. While you may pick out localities of discouragement, yet as an observer these many years of the underlying facts, and the ground-swell of progress, I am sure there has been a steady deepening of the foundations and widening of the area and uprising of the strength of this great cause. The great American Constitution, the State Constitutions, and these human constitutions will be found in this regard co-operating to conserve and preserve each other, for it means not a whit less than national life and prosperity. They are necessary to each other, and will find it out while over each and all the ægis of law will extend its gracious protection.

It is a study and a practice which has its foundations in the nature of man and in the essentials of personal, social and civic existence.

In it law and providence, science and art, philanthropy and philosophy invite us to pure work, to great obedience, and to that noble devotion which consecrates itself to loving service for God and for humanity. Would that it might bind us closer to each other in the sympathies which are natural to those in kindred occupations, closer to all our fellow men, whose welfare is so much a part of our own, and closer to Him with whom is the power of an endless life.

SUGGESTIONS UPON THE FOOD OF ARCTIC EXPLORERS.

By T. J. TURNER, A.M., M.D., Ph.D., Medical Director U. S. Navy.

In a paper upon Arctic Hygiene, published in THE SANITARIAN for June, 1881, the writer formulated the conclusions derived from some research upon the methods of preserving the health of Arctic explorers, in so far as *food* was in question, as follows:

1st. That there is an absolute necessity for an ample supply of animal food.

2d. That this food should be mainly of fat.

3d. That such food is more valuable, as a food, when obtained from animals recently killed.

4th. That the Arctic explorer should accustom himself to live upon the flesh of Arctic animals.

5th. That a full meal should be taken at the end of a journey—after work.

6th. That fresh, raw animal food is the best anti-scorbutic.

It is not proposed at the present time to enter upon the details of Arctic sanitation, but simply to cite additional testimony to the above conclusions, and to add some few suggestions principally relating to foods of those engaged in polar researches.

In a paper, read before the Royal Medical and Chirurgical Society, at its meeting in February, 1883, by Mr. W. H. Neale, the medical officer of the Eira expedition, upon the "Etiology of Scurvy," he remarks, while contrasting the expedition under the command of Sir George Nares, with that of the Eira, as follows: "From a consideration of the dietary, it was evident that the absence of scurvy in the Eira expedition could not be ascribed to the employment of a larger total weight of food, and in particular not to the larger quantity of vegetable food, nor to lime-juice, which was not used for a whole year. No case

of scurvy occurred among the crew of the Eira. But the diet of the two expeditions differed widely in the kind of meat used; the crews lived almost entirely on preserved meats, in the government expedition, while the crew of the Eira lived exclusively on fresh meat from animals killed on the spot. All flesh obtained in the Arctic regions can be kept in a state, though frozen, chemically like that in which it was when the animal was killed, and must therefore supply to the body those ingredients which are known to be diminished in scurvy far more readily and abundantly than can preserved meats;" and Mr. Neale further states that the albuminoid food should be abundant, and consist as much as possible of the flesh of recently killed animals.

Dr. Colan, of the Nares' expedition, agreed with Mr. Neale "as to the good derived from fresh meat, which should be raw, and, if possible, in large quantity; he had given his men the skin of the narwhal and walrus flesh, and it was the best substitute for fresh vegetables, possibly because of the lactic acid in the flesh."

Captain Murray, of Peterhead, had wintered in the Arctic eleven or twelve times, but never had scurvy, living upon seal-meat.

Professor De Chaumont remarked, "that the want of fresh meat was a cause of scurvy. It was a disease of the blood due to deficiency of organic acids and salts. * * * * It was probably the lactic acid in fresh meat that gave it anti-scorbutic qualities."

Sir William Smart added his testimony to the anti-scorbutic value of fresh meat, and mentions dried fresh fish as useful in these latitudes as a food.

Dr. Rae, at the same meeting, cited his experience, and mentioned the high value of some extract of tea supplied him by Dr. Bence Jones. Dr. Rae's men "used meat chopped up fine and mixed with the animal's blood, which was preserved frozen in the stomach." He also mentioned that the Kaffirs eat the vegetable matter found in the stomachs of oxen, and I have the authority of Mr. George Kennan, that in Siberia the contents of the stomachs of the reindeer is eaten with a relish. It is principally vegetable matter. It is stated from experimental investigation that in the herbivora the carbo-hydrates

may split up in the alimentary canal into lactic and other acids, and this remark is here interpolated for the better understanding of some further suggestions.

At a meeting of the Epidemiological Society in December, 1883, Sir William Smart, M.D., R.N., read a paper entitled "Scurvy in its Bearing on Explorations by Sea," from which the folowing notes are taken: "Experience seems to show that in the Arctic regions the compulsory enjoyment of any fresh air with the necessity to obtain fresh animal food from indigenous animals is more conducive to health and the avoidance of scurvy among castaways than life in ships, where men dwell in a warm, moist and vitiated atmosphere, and are fed in the best of ship's diet, with lime-juice as an anti-scorbutic, but without the advantage of much fresh animal food, which is second only to fresh vegetables in the prevention of scurvy."

These statements, made by eminent Arctic explorers, physiologists, chemists and sanitarians, lead me to present for consideration from chemical and physiological bases the following suggestions as to some elements in the food supply for Arctic voyages.

It is known that in many of the methods for the preservation of meats there is a loss of the salts, principally the sodium, potassium and calcium phosphates, as well as a loss in the meat juices which contain lactic acid and the lactates. Indeed, Professor De Chaumont in his edition of Parkes' Hygiene, asks as pertinent to this inquiry, "Are the anti-scorbutic properties of fresh and raw meat connected with this acid, and is it destroyed by cooking? It would seem so, even in the preparation of preserved meat-foods, which require abundant vegetable matter to facilitate their digestion. Now these salts and acid are known to be essential in the physiological role of flesh as food.

Again, as these salts and the acid appear to be removed or changed in the preparation of preserved and cooked foods, it occurs to the writer that they may be replaced in the food by adding to the common table salt used as a condiment with the preserved food, a determinate quantity of a mixture of sodium, potassium and calcium phosphates; to the vinegar used as a condiment, in like manner to be added also a determinate quantity of lactic acid.

Thus is returned to the preserved meats those proximate

elements that have been removed by the methods of preservation. A few moments' consideration by any physiologist will show that this is entirely feasible, and that it is a chemical approach by an artificial restoration of the natural elements towards the normal, *i. e*, the physiological conditions existing in fresh meat.

Without entering upon the discussion of the value of tea, or the part it performs in the phenomena of nutrition, or its value as a food under the rigors of an Arctic climate, it remains a fact that its use as a beverage is universally agreed upon, and that it is an essential part of the Arctic diet table. Considering that its bulk, even when compressed, renders its carriage objectionable on sled expeditions where every ounce of unnecessary weight and bulk carried represents expenditure of force —work, which it is desirable to keep up to its full normal of efficiency—recalling that its physiological value as a food is known to depend upon its active principle, *thein*, and that *guarana* is known to contain nearly twice the amount of an identical active principle with like physiological effects, the mode of use being the same in each article, it being more readily carried, taking up less space, as its bulk is trivial compared with that of an equal weight of tea, and the smaller quantity that can be used to produce the like effect as tea, I am led to suggest its use upon sled expeditions. It could be made up into packets of a definite amount, ready to be added with hot water, and, with the addition of the lime juice, the hot infusion is rather palatable. The use of dried fish, not smoked nor salted, as a food, is worthy further consideration. Its food value is not well known from scientific observation, but its use has the endorsement of such well-known observers as Rae and Kennan.

To sum up. It is suggested that there be added to the table-salt a small quantity of the phosphates of sodium, potassium and calcium, that a certain amount of lactic acid be added to the vinegar at the time of their use upon preserved meats, and that guarana be supplied for the use of sled parties, accompanied by simple instructions as to its use. It is believed that these suggestions have a theoretical as well as a practical value, and they are offered without further detailed explanations, as a fragment of applied physiology.

WASHINGTON, D. C., March 4, 1884.

TYPHOID FEVER IN THE CITIES OF THE UNITED STATES.

A. N. BELL, M.D., Editor SANITARIAN.

DEAR DOCTOR: Enclosed please find a table, giving the results of a recent study of the "Report of the Mortality of the Cities of the U. S. for 1883," published in *Sanitary Engineer* for Feb. 21st, 1884.

1883.	Deaths in all Cities reported from	Deaths in Eastern Cities from	Ratio per 100 of Deaths in E. cities to all Deaths from	Ratio per 1000 to Total Deaths.	Eastern Cities.—Population and Total Deaths. Albany, New York, Brooklyn, Hudson Co. (N. J.), Newark (N. J.), Philadelphia, Wilmington.	Ratio per 100 of all reported
1st QUARTER.						
Typhoid Fever	711	286	40	14	Population—3,210,438.	47
Malarial Fever	334	182	54	9	Total Deaths—19,505.	50
2d QUARTER.						
Typhoid Fever	508	223	41	12	Population—3,150,077.	48
Malarial Fever	424	225	53	12	Total Deaths—18,300.	50
3d QUARTER.						
Typhoid Fever	1115	435	39	21	Population—3,201,177.	45
Malarial Fever	743	286	38	14	Total Deaths—20,608.	47
4th QUARTER.						
Typhoid Fever	1055	428	40	25	Population—3,380,400.	48
Malarial Fever	555	211	38	12	Total Deaths—16,914.	48
TOTAL YEAR						
Typhoid Fever	3389	1372	41	18	Pop—3.235,523 (mean)	47
Malarial Fever	2056	904	39	12	Total Deaths—75,327.	48

Assuming the general correctness of the diagnosis of deaths from typhoid and malarious fevers (which, I am aware, is assum-

ing a great deal) the following rather singular points are the results of a study of this table:

1. Taking the mortality from malarial fever at Bellevue Hospital as a normal one for the Eastern cities, we have $904 \times 200 = 180{,}800$ as the number of cases of malarial fevers in these cities for 1883.

2. For the year (1883) the Eastern cities, with 47 per cent. of the total population of cities reported, and 48 per cent. of the total mortality of the same, have 41 per cent. of the total mortality from typhoid, and 39 per cent. of the total mortality from malarial fever.

3. When we consider some of the different quarters of the year the conclusions are more marked and more singular.

Taking the first quarter (Jan., Feb. and March), we are somewhat surprised to find that with 47 per cent. of the population and 50 per cent. of the deaths of cities, the Eastern cities have 54 per cent. of the deaths from malarial fever in the cities reported.

In the second quarter (April, May and June), the ratios of populations and deaths being nearly the same, the Eastern cities have 53 per cent. of all the deaths from malarious fevers in the cities reported.

4. From all of which it may be fairly concluded, either that there is a great deal more of malaria in the Eastern cities especially, than has been suspected during the winter and spring, or that there has been a general incorrectness of diagnosis in ascribing many deaths to malarial fever, which should have been given to typhoid fever. R. J. FARQUARHARSON.

DES MOINES, Iowa, Feb. 27, 1884.

MILK FOOD.—The undersigned has within the last few months employed the Anglo-Swiss Condensed Milk Company's Milk Food for weakly children inclined to chronic diarrhœa, and has found it to be a very easily digestible and strengthening preparation, and one that agrees well with all children, even with such as are suffering from chronic and acute diarrhœa, or whose digestive organs have been impaired by the use of unsuitable food or by teething, &c., while at the same time it promotes their growth most satisfactorily.

BERNE, March 2, 1881. DR. DUTOIT.

HOUSE SANITATION.*

By W. F. SHEEHAN, M.D., Health Officer of Rochester, N. Y.

A house over a damp site is never healthy. The ground moisture is continuously striking up the walls, and through cellar bottoms improperly constructed, and the inmates suffer from frequent attacks of catarrh, neuralgia and rheumatism. Consumption is now regarded, in a large measure, as due to the same unsanitary condition. Investigations by Dr. Bowditch proved this in Massachusetts, and Dr. Buchanan sums up the English experience as follows: "That wetness of the soil is the cause of phthisis to the population living upon it, and this proposition may be affimed generally, and not only of particular districts." (Buck's Hygiene, vol. I., p. 412.

The ground water theory of typhoid fever has been affirmed and maintained by Pettenkofer and others. A high mortality rate from zymotic diseases prevailed along the old water-courses of New York city, which in process of time had been filled in and built over.

The paroxsymal fevers are closely related to the level of the ground water and to the degree of ground moisture, as instanced by the Indian experience reported by Parkes. At Pola, in Istria, for example, there are no marshes, but in the summer sometimes half, sometimes 90 per cent. of all cases are malarious; the reason is that a dense clay lies a little below all alluvial soil, and the only exit for the rain is through two valley troughs, which cannot carry off the water fast enough in the wet season from February to May." (Parkes, Prac. Hygiene, Vol. II. p. 351, Wood's Edition.)

Physicians and health officers have frequently observed the relationship between disease and damp sites.

That group of symptoms described as malaria is most often found in city houses whose foundation walls and cellar floors are made damp and foul by leakings from cisterns, improperly

*Read before Medical Society of the State of New York, Feb. 20, 1884.

constructed drains, privy wells and cesspools. Numerous cases have come under my own observation. A few to the point:

1. A neighbor's drain joined the house drain under the cellar bottom; obstruction at the point of junction, and escape of waste for a number of years into the ground. The inmates were frequently attacked with malarial symptoms.

2. A neighbor's privy well situated close to the foundation leaked into an adjoining cellar; inmates frequently ill with malaria, diphtheria, etc.

3. A similar experience detailed me by a certain physician. He was forced to leave his home in order to shake off malaria.

4. In many houses cisterns are still maintained as relics of the past; the water is not used, but is allowed to stagnate and overflow into a drain, or to leak into the ground. The people are located over a miniature marsh, and suffer frequent attacks of malaria. If a house is to be healthy, the ground water and moisture must be excluded from the inmates.

Subsoil drainage will effect the former, and damp courses laid in the foundation walls, or dry areas around them, the latter. The necessity and utility of both are abundantly proven Two royal stables near Munich, with the same arrangements as to stalls, feeding, attendance, etc., suffered very unequally from fever. In the one, the level of the ground water was five to six feet below the surface; in the other only 2½ feet. The latter was the unhealthy stable, and when it was drained so that the ground water was as low as the other, it became equally as healthy.

In a house erected by Eassie, near London, he estimates the foundation walls occupied 8,000 cubic feet, or 115,000 bricks; under ordinary circumstances the bricks will contain 5,000 gallons of water, and if the subsoil is very humid or porous, the bricks will absorb and retain 7,000 gallons of water plus the matter contained in the mortar. This wet will be continuously striking up into the walls by capillary attraction exerted over 2,400 cubic feet. He adds, dampness from these sources has often been traced up thirty feet in height above the ground. If, therefore, dampness and disease from ground water and moisture are to be kept out of the dwelling, courses of impervious material should be placed in the walls about one

foot above the level of the ground, or above the rain water splash.

For the same reason, and for additional cause, the cellar bottom and side walls should have a coating of material impervious to moisture and ground air. The cellar, as ordinarily constructed, is little better than the ancient dug-out. Excavated out of made earth containing in cities garbage, dead animals and all sorts of waste, mixed with ashes and road scrapings, which, according to Liverpool experience, is purified of its organic impurities in not less than three years, foul and disease-producing emanations escape into the house above, drawn upwards by the suction of the fires which, in our climate, are more or less active for nine months of the year. During the winter, when frost and a covering of snow hinder the escape of ground air outside the houses, a larger amount escapes indoors, and the supply is drawn horizontally for many feet from beneath leaky cesspools, privy vaults and imperfectly constructed drains and sewers. In Rochester for the past two winters, the health authorities have noticed an increase in diphtheria as soon as the ground and the street openings into the sewers have been covered for some time with snow.

Ground air in itself, and free from the impurities imparted to it by the filthy habits of man, is not devoid of poisonous qualities. The large amount of carbonic acid it contains sometmes renders it irrespirable at no greater depth than thirteen feet below the level of the ground. "How many cellars go as deep as thirteen feet, and from how many cellars the air is drawn into our houses by the action of the fires in winter."

Pasteur has discovered the germs of fowl cholera in the ground around a lady dead from that disease, and believes these germs capable of developing the disease in the living animal. Yellow fever and cholera, it is stated, are developed from specific germs which escape from cemeteries. The germs of typhoid fever escape into the ground air and water, and subsequently into the air of houses, and into wells from leaky cesspools and drains. Pettenkofer estimates that the sandy porous soil of Munich is contaminated by ninety per cent. of the contents of its numerous cesspools. Where does typhoid fever prevail to a greater extent than in Munich? Perhaps in rural life, where so-called sewer gas is absent, if our country practitioners would

seek for the causation of diphtheria, typhoid fever and other zymotic diseases in specifically contaminated ground air and ground water, less would be heard in way of opposition from that source to the germ theory of disease, and to the dangers of sewer gas poisoning. Sewer gas is nothing but filth gas, and it is found in the country and village as well as in the city.

All are familiar with the outbreaks of typhoid and typho-malarial fevers along streets in which old sewers are being enlarged and deepened. Last year, in Rochester, an endemic of diphtheria occurred in a locality where the street sewer was being cleaned.

A case of diphtheria was brought to the attention of the health officer in a man who had been excavating and removing the earth from a site on which a house had stood for many years.

The permeability of soil to air and gases is shown by the rapidity with which illuminating gas passes for long distances from leaking mains into cellars. Pettenkofer reports poisoning from this source, the gas having escaped twenty feet. In Rochester I have known gas to pass forty feet through the ground, and to drive the inmates out of the houses. As damp courses of slate, asphalt, sheet lead, vitrified stone ware and glazed bricks are necessary to keep ground water and moisture from striking up through the foundations, so must impervious coating be dispersed over the cellar bottom in order to exclude the ground air, polluted as it most frequently is, with organic effluvia and specific disease germs.*

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* Easie recommends a layer of concrete six inches, and over this a layer of cement in which flags are laid.

Prof. Chandler recommends first, a layer of cement, over this a layer of coal tar pitch in which bricks are set on edge. The spaces between the bricks are filled with the pitch, and over all a coating of coal tar pitch. When the house is being built, he advises coating the outside and inside of the foundations with the same materials. Such a cellar floor was considered absolutely impervious to ground air and moisture.

Dr. Moore, Pres. State Board of Health, recommends a layer of chipping from the stone work, set edgewise; over this, a layer of coarsely broken stone; next a layer of coarse gravel; next a mixture of water, lime and coarse sand; and over all, a coating of water lime and fine sand. If, in connection with Dr. Moore's cellar bottom, a trench cut around the house about a foot lower than the foundation stone, and filled with coarsely broken stones, ground air and moisture are provided for, and agricultural tiles will not be needed in the majority of dwelling sites.

REMOVAL OF WASTE.

To remove the waste from the household, a small tube should extend to the street sewer, or to a properly constructed cesspool in the absence of the former.

This tube or pipe should be made of impervious material, either iron or vitrified clay, with joints properly luted, and as secure as the ordinary gas main or water main. The interior of the drain should be perfectly smooth, and of such a calibre as to best accommodate the amount of waste to be disposed of.*

A slight but continuous grade is to be maintained, with no sudden dips or depressions to hold the sewage. The grade most appropriate is one of 1¾ or 3 inches in every 10 feet of pipe. If circumstances should require the drain to be laid at much less grade than the above, a flush tank should be constructed near the house, and should be discharged into the drain at stated intervals.

Drains, as ordinarily constructed, are more calculated to leak the household waste into the lot than to convey it into the street sewer. The pipes are carelessly thrown together in a trench unevenly cut, and the joints are mortared solely on the upper surfaces. The earth is loosely thrown around them, and not thoroughly rammed. In "made" sites there is uneven settling of the ground, and the course of the drain is thus distorted and the joints opened.† The roots of growing trees are often found thrusting themselves into the joints of drains.‡ Numerous instances of these defects are found on record or come daily under observation, with many others of related character. Teale's "Dangers to Health" illustrates a drain which was made to terminate at a solid rock 12 yards thick; beyond the ledge a length of pipe was laid connecting with the main drain in the street. For seven years the waste from a water closet had been collecting under the cellar floor, and the children were always ailing. He adds, "No doubt it was in order to save

* A 4 inch drain will suffice for a small house, a 6 inch for an ordinary sized, a 9 inch for the largest mansion, even for a factory or shop in which many hands are employed.

† In made sites Easie recommends laying the drain on a bed of concrete.

‡ To turn them away, Mecchi advises coating with coal tar.

the expense of blasting through the rock that the contractor had scamped the work."

In the same work is found an illustration of a drain-pipe passing over a rock, so placed, presumably, to avoid the expense of cutting through it at proper grade.

In a house on Lake Avenue, Rochester, the drain layer has miscalculated grade, and when he reached the cellar wall, carried the drain in at a graceful bend. Very soon the drainage was obstructed and the cellar flooded. The owner had the pipes dug up, and found not only the above defective grade, but also that the joints had merely been cemented on the upper surfaces, and that sandy soil freely entered at the lower surfaces.

The original cost of laying the drain was $158; the repeated laying cost $123; *i. e.*, $123 was paid for the sin of the drain-layer.

In another house on the same avenue the drain-pipe was found running up hill under the cellar floor.

In a public school recently examined, porous, unjointed agricultural tiles were found in the cellar bottom, designed to carry the waste from fixtures in the school-rooms to the street sewer. The sewer gas became so strong and abundant in the rooms that the children had to be dismissed, when investigation uncovered the above defect.

In a private house, from which the doctor had never been absent, a similar drain was found under the cellar floor, and the additional defect of a rat-hole in the bend of the lead soil-pipe as it entered the drain, through which the waste had escaped into the ground, and eventually into a well.

As the drain approaches the house a dip or depression should be made in its course. This is to retain a certain amount of waste, and constitutes what is known as the "running trap," designed to lock off the street sewer with its contained foul air from the pipes within the house. Some would remove the trap altogether from the drain, preferring to allow the sewer air to enter the house pipes, and escape above the roof. If every house had a main soil-pipe passing through the roof, as at Memphis and Pullman, the running trap might be dispensed with, for then one would ventilate the drains and pipes of the other, owing to a different degree of temperature in each house, from

location, heat of sun or fires; but in cities sewered on the combined system, where not one house in ten has the soil-pipe passing through the roof, the running trap in the house-drain outside the house must be insisted upon as an imperative necessity.

Between the running trap and the house the drain must be tapped by a small pipe, which can be run up the front wall of the house or brought above the surface of the ground and turned over as a goose-neck, or led diagonally up to the standard of a flower vase, through which it passes to an air chamber under the floor pot. Practically this is a fresh air vent for the house pipes, and not an escape for foul air, though occasionally, when the main pipe within the house is filled with a descending play of waste water, there is an outgoing puff of air through the vent pipe. At all other times, owing to the higher temperature of the pipes within the house, the current sets inwards through the fresh air inlet.

The drain* is now carried through the cellar wall, and precaution is taken against crushing of the former by settling of the latter, and run above the cellar floor or diagonally along the cellar wall, to which it is securely bracketed, until it reaches the party wall or partition, against which it is securely supported and extended to the upper floors and through the roof without bend or narrowing. It is the common practice to lay the drain under the cellar bottom, to trap it just inside the cellar wall, and to have numerous openings to branch pipes in order to carry off any surface water that may collect in the cellar. This system cannot be too strongly condemned. It is the one most frequently found in city houses remarkable for sickness from zymotic disease. In such a cellar I recently found a sausage factory. The waste pipe from the refrigerator passed, untrapped, loosely into an opening in the tile drain; in the other end of the cellar the waste pipe from the sink terminated similarly. The owner worked at a table placed over the opening in the drain, which was exceedingly foul. He died of typhoid fever.

In another house, terribly afflicted with diphtheria last summer, similar openings were found in the drain, with the addi-

* If the grade requires the drain to be laid under the cellar bottom, a trench should be cut, lined with concrete, and covered with a removable grating.

tional defect of the pan-closet up-stairs on an unventilated soil pipe.

On a street in which diphtheria passed through several houses, similar or worse defects were found in all of them. In fact, serious sanitary defects are discovered in most of the houses where deaths occur from zymotic diseases. In houses properly and sanitarily "fixed," death from this class of diseases seldom occurs.

The running trap, the fresh air vent and the soil pipe carried through the roof are the essentials of house drainage and plumbing; they are the trinity of safeguards against sewer-gas poisoning.

To remove the waste from the various rooms in which fixtures are placed, subsidiary or branch pipes must be connected with the main or soil pipe.* The fixtures which these wastes serve are water-closets, bath-tubs, wash basins, and slop sinks. It is safest to concentrate the fixtures on any one floor into one room, and for that matter the fixtures of the whole house should be placed in one room. Concentration of fixtures means frequent use; frequent use means thorough flushing; thorough flushing means comparative cleanliness. Fixtures placed in spare rooms are apt to be seldom used, and hence the water in the trap is liable to evaporation. Moreover, long horizontal waste pipes intervening between the fixture and the soil pipe accumulate poisonous gases, which escape into the rooms through the unsealed traps. Each fixture should have a special trap placed as close as possible to it, and each trap should have a special vent pipe connected with the crown of the trap and passing into the soil pipe above the highest fixture, or into a common vent pipe which opens into the soil pipe above the highest fixture or is carried directly through the roof.

The simplest form of trap is the common S, or bend in the pipe. When it became known that gases passed through the water in the trap, certain mechanical adjuncts were added, and thus the Bower, Cudell, and certain other varieties came into

* The sizes of the branch waste pipes are fixed by Rudolph Herring: for wash basins, at least 1¼ inches; bath-tubs and kitchen sinks, 1½ inches; for slop sinks, 1¾ inches. As the soil pipe is iron and the smaller pipes lead, the junction should be effected through a brass sleeve or ferrule.

the market. However, they are almost as liable to siphonage as the simple water seal, and are as useless as the former when evaporation has taken place. The mechanical adjunct is no barrier to sewer gas in certain conditions. I have found the ball of the Bower trap held aside from the mouth of the inlet pipe by matches held together by hair from my lady's dressing case, and I have known foul gas to escape through a Cudell trap into a room on a lower floor, every time a water closet was used up stairs. The fact is, the trap has yet to be invented which will exclude sewer gas, and which will retain a perfect seal against siphonage and evaporation in the absence of proper ventilation.

"A trap is siphoned either by the momentum of falling water sweeping through or out of a trap, or by compression or rarification of air on one side against the ordinary atmospheric pressure on the other side of the trap. Numerous observations and experiments are recorded showing how readily, under quite unsuspected conditions, siphonage may take place. To guard against the losing of the seal by momentum, the only remedy is to have it as deep as possible, and to destroy the momentum by making an abrupt change in the direction of the flow. Far more important is the loss of seal by uneven pressure on both sides of the trap. It will be readily seen that falling water in the discharge pipes, especially when almost filling them, will tend to compress the air below, and rarify the air above. If equilibrium of pressure cannot readily be established in the pipe, it will establish itself by drawing out the seal of the upper and forcing out that of the lower traps. As this is an essential point to guard against in every drainage system, it becomes necessary, therefore, to provide equally for both, an escape and supply of air throughout the entire system of pipes." *

Various experiments have been made to test the liability of different traps to siphonage under varied conditions—by Hellyer in England, by Philbrick and Bowditch in this country for the National Board of Health. The former sums up his conclusions in these words: "When tiers of traps of every description are fixed upon one main pipe for receiving discharges

*Rudolph Henney, C. E., Am. P. H. A., 1883.

from water closets, slop seats, baths, quick waste lavatories, each individual trap or branch must be ventilaled, if the traps upon the piping are to maintain the seal intact." The conclusions of the latter are: "Whenever branch inlets are connected to a line of waste or soil pipe, that is vertical or approaching that direction, above which branches, other fixtures are used for discharging water into the same main, there is great risk of losing the water from the traps attached to such branches whenever the upper fixtures are used. They know of no form of trap without special air vent, which is not likely to lose its water seal under such circumstances, even when the top of the soil pipe or waste pipe is open, except those which, like the round trap, are objectionable for retaining filth. The best and most simple remedy in their opinion for the siphonage of traps, is the introduction of air at the normal pressure at the crown of the trap. The vent pipe should be the size of the trap it is to serve unless it is more than two inches in diameter."

Each fixture should have a "save-all" or drip tray beneath it, and the waste pipe from such tray should not connect with the soil pipe or drain, but should open directly in the cellar, where its drip, if any, can be caught in a pail.

Of all fixtures within the house, water-closets are regarded with the most alarm. Their numerous recesses and complicated mechanism render them most liable to fouling with the waste, the most poisonous of all filth when decomposition has set in, which they receive.

The pan closet, the one hitherto most commonly used, is the filthiest of all varieties. The valve closet is an improvement, though constructed on the same principle; the plunge is still better, and the washout, usually constructed in one piece, is best of all.

Simple hopper closets command the sanction of some of the best sanitarians* when properly supplied with adequate flushing water.

Whatever style of water-closet is used, it should receive its flush from a special tank, and not from the water pipes which supply water for other domestic purposes. Instances are on

* George E. Waring, Jr., A. N. Bell, Dr. Janeway in Hamilton's Paper.

record where typhoid fever has been caused by the escape of foul air into the service pipes from water-closets.

The space under the water-closet, and in fact under all fixtures, should be specially ventilated, but this vent pipe should not terminate on the same level as the soil pipe, nor pass into a chimney-flue. A sudden cooling of the air within the house may create a down-cast in the vent pipe, and then draw in the foul air which has escaped through the soil pipe.

Such a system of plumbing as I have attempted to outline is not found in one-tenth of our houses. Instead, there are fixtures and pipes, it would seem, specially designed to draw foul air into our houses. Bad system, poor material, and scamped work, have prejudiced the people against all plumbing, until they are ready to cry, "Away with it! Let us return to the primitive methods of waste disposal and storage." Men high in authority have lent their voice to the swelling prejudice, and pictured a "struggle for life against civilization and æstheticism" (as represented in particular by modern plumbing and sanitary fixtures). If the words "Filth and Ignorance" (as represented by the popular knowledge of house sanitation) were substituted, I am convinced a more accurate knowledge of the true difficulty of the situation would prevail.

THE U. S. MARINE HOSPITAL SERVICE AND QUARANTINE.

The annual report of the Marine Hospital Service for 1883,* as compared with previous reports of the same service, is of unusual magnitude; chiefly, it appears, by reason of the new duties devolved upon the service, in the expenditure of the fund for the prevention of epidemics, to which 135 pages are devoted.

Primarily, 40,195 patients are reported upon in the regular service, as the number to which relief has been rendered—13,356 in hospitals, and 26,839 at dispensaries. Days' relief furnished in

* Annual Report of the Supervising Surgeon-General of the Marine Hospital Service, for the fiscal year ending June 30, 1883. pp. 406.

hospitals, 327,312; trusses, 46; elastic stockings, 35; peg-legs, 5; knee-caps, 3; glass-eye, 1—at an expenditure of $469,966.21. This amount includes $35,440.92 expended on account of extraordinary alterations and repairs to hospital buildings.

Receipts from all sources, $426,620.35—tax on seamen for the year, $415,945.80. What the number of "seamen" in the merchant marine service, which gives 40,195 patients for treatment; how many and what proportion of them are women and children in domestic service on board of canal boats and ferry boats, from whom this amount of tax has been collected at $4.80 per capita; and how many more of *such* seamen there are in the marine service, who have refused to pay the tax, are interesting questions in this connection, which the report fails to answer.

Some cases of scurvy are reported with evidence of violation of the law which requires lime-juice to be an article of stores, and served under certain conditions; but the evidence was deemed insufficient for prosecution. A tabulated statement of 121 deaths, with the causes, "on voyages from foreign ports to this country, from July 1, 1882, to June 30, 1883," from non-contagious diseases, is given, but as there is no record of the number of persons among whom the deaths occurred, by which the death-rate could be computed, the statement is of no value. Of small-pox treated at the various Marine Hospital stations in the United States, there were 141; 78 recovered, 60 died, the results in 3 not reported. The number of men vaccinated was 1,804. Under the head of Hospital Buildings and Grounds, diagrams of the block-plan of the hospital-building at Memphis and of the new one proposed for New Orleans are given, which are excellent. The old—unfinished and never occupied—hospital building at New Orleans, appears to be still on the hands of the department, and the subject of widely different opinions for and against its availability. The worthlessness of this structure, the waste of nearly $600,000 of poor "Jack's" money thereon and other similar outlays were among the special items of our animadversion, in a review of the Report of the Supervising Surgeon-General for the year 1882—(Vol. XI., p. 236). Most of the exceptions in our review of the report in regard to this and other wastes of the Marine Hospital fund, and the indefiniteness of detail in the official report of 1882, apply equally to this for 1883.

Secondly, in regard to the Quarantine service. This is very elaborate, and bears evidence throughout of an effort to show the special fitness and adaptation of the Marine Hospital service to its execution. There is a profusion of correspondence in regard to the epidemics of yellow fever in Brownsville and Point Isabel, Texas, in 1882, and great stress laid upon the extensive *cordon*, and its efficiency in confining people to the infected region. But nothing whatever in regard to any measures taken for the removal of the people, sick or well, to healthy places, or cleansing the premises. Indeed, one particularly notable communication, which displays the policy of the *cordon* system, by the Surgeon-General of the Marine Hospital Service, addressed to the State Health Officer of Texas, under date of Sept. 7, 1882, and published in the "Preliminary Report of the Yellow Fever Epidemic of 1882, in the State of Texas," p. 34, is omitted in this final report. It is as follows:

"You are doubtless aware of the two *cordons sanitaire* in the southwestern portions of Texas. . . . . I write for the purpose of suggesting that, as soon as the yellow fever has exhausted its material at Brownsville, which it now seems likely to do at no distant day, an inspection of the ranches in the space now confined between the cordons be made as early as practicable." . . . .

This is the kind of quarantine which the Surgeon-General of the Marine Hospital Service is urging upon Congress for the United States in this last quarter of the nineteenth century! He has a chief disciple, it appears, in the Governor of Texas, who, following the example of the Marine Hospital Service practice in Texas in 1882, is reported as having promulgated the following orders for the coming summer:

GALVESTON, TEXAS, March 1, 1884.

A special to the *News*, from Austin, says: "The Governor yesterday issued a proclamation establishing a quarantine on the coast of Texas, beginning May 1. It applies to vessels from any port south of the twenty-fifth degree of north latitude, unless proof that the port from which a vessel arrives is not infected be submitted to the Governor's special commission, and an exemption granted. Vessels with clean bills of health and no sickness on board will be detained outside for twenty days, and other craft for the entire season. At Galveston, however, the cargoes of vessels with clean bills of health,

and no sickness on board, may be immediately discharged in the disinfecting warehouse at the quarantine station for twenty days' detention."

Let the reader imagine, if he can, what the effect would be upon commerce, of a national quarantine conducted upon this principle, or if all our ports of entry adopted such regulations. Yet this is the system urged in the report before us. Its whole spirit is to detain persons on board an infected ship, or confine them to an infected place until the disease "has exhausted its material"—until it has spent its force upon all susceptible subjects—and *then* proceed with inspection and sanitation!

Such was once the practice, and for a long period of time; but it was before the nature of infectious and contagious diseases was understood. It was in vogue, more or less, from its first institution at Venice, early in the twelfth to the early part of the present century. Such was the quarantine which gave significance to the name—an interdicted commerce—and kept persons in "leper houses" or "leper ships" for forty days, with interminable renewals, until the disease had exhausted its material with the lives of those who were subject to it, while the filthy ships and filthy places continued to be the hotbeds for new invasions at every return of the season, or new accession of subjects.

Urging the *cordon* system by precept, and illustrating it by example—as practiced in Texas in 1882, and offered for Pensacola, 1883—the Surgeon-General of the Marine Hospital Service proceeds to demonstrate to his own satisfaction the unwisdom of the National Board of Health in establishing a Refuge Station at Ship Island for the prompt treatment of infected vessels and merchandise, and the proper care of persons; and recommends Chandeleur Islands, because a little nearer New Orleans, but less accessible for vessels, with an inferior anchorage ground, and with less protection—a preference evidently based upon an erroneous conclusion that the station was chosen with reference to New Orleans alone—on "a point repeatedly made by the Louisiana State Board of Health," but against the expressed preference of the merchants of New Orleans, whose judgment was thoroughly canvassed before the choice of Ship Island was made; and, as appears by the report of Captain Thomas W. Lay, of the Revenue Marine, by order of the Sec-

if in spite of these precautions, pestilence manifests itself in any place, abandonment of the locality with the utmost dispatch until the cause of the pestilence is found out and eradicated.

In its enthusiastic war on the local causes of disease, the General Board of Health includes among them quarantines, and in the Report for 1849, by resolution declared: "That quarantines, instead of guarding against and preventing disease, fosters and concentrates it, and places it under conditions the most favorable that can be devised for its general extension."—No one practically familiar with the diseases commonly subjected to quarantine, the local conditions under which they commonly prevail, and above all, with the special conditions promotive of their continuance on board ship, when once introduced, will question the righteousness of this conclusion of the General Board of Health of England. With a practical appreciation of the conditions involved in this action abroad, the leading sanitarians of the United States, at the instance of Dr. Wilson Jewell, of Philadelphia, held the Quarantine and Sanitary Conventions of 1857, '58, '59 and '60, in the promotion of the same purpose; and at the last of these conventions, held in Boston—1860—adopted, as its unanimous sentiment, regulations to abolish quarantine in this country, with its ancient significance—the *cordon* system; and to substitute for it a thorough inspection and cleansing service, to begin at the port of departure.

No vessel to be allowed to depart from any place until she is in a thoroughly healthy condition and outfit, in both *materiel* and *personnel*, and provided with all necessary regulations, means and instruction for the preservation of health, at the time of departure and during the voyage; sanitary measures on arrival, in detail, with special reference to a bill of health from the last port of clearance, the health of all persons on board, and the hygienic condition of the vessel, provisions and cargo, with explicit directions for *immediate* provision for the sick, *removal* of the well, and thorough cleansing of the vessel, with such detention only as may be necessary for these *active measures*—instead of the hitherto fatal and disease-promoting restrictions—as the only kind of quarantine to be tolerated and relied upon equally for the protection of the

public health, the promotion of commerce, and the exercise of humanity.

Moreover, the same convention had in contemplation a national system to perfect and carry out these purposes; but in following up the subject—by its committee, which was continued and authorized so to do—a national quarantine was found to be impracticable, by reason of an insufficient number of organized local and State boards of health to support and enforce it. Dr. Brown's report in 1872 was in the same direction, was based upon the same general knowledge, and still impracticable for the same reason. But at the present time there is scarcely a port of any importance on the whole water coast of the United States that has not an organized board of health, and most of them under the auspices of State boards of health qualified to aid in the efficient support of a co-operative national marine health service, under intelligent direction.

The National Board of Health, created five years ago, was the outcome of this progress in local and State sanitation. To reform, unify, and render efficient the quarantines of the country, by the institution of active measures, such as are here briefly indicated, and which have been practiced in England for the last twenty years, were its chief efforts from the outset, and signally illustrated in Memphis and New Orleans. In Memphis by the depopulation and cleansing of the city; in New Orleans by stamping out the disease before depopulation became necessary, and by the establishment of a thorough inspection and cleansing service of all vessels before departure from the infected port. This service afforded the first, and thus far the only demonstration of a "quarantine" service in this country alike promotive of health and commerce, and the prevention of quarantine at ports of arrival. It was conducted on a principle totally diverse from that which has been practiced, and is now urged upon Congress and the Treasury Department by Surgeon-General Hamilton. The system which he urges has long since been abandoned by all sanitarians, and is advocated and practiced by those persons only who have had no practical knowledge in dealing with epidemic diseases in their relation to commerce.

A. N. BELL.

SEWERAGE OF SACRAMENTO, CAL.

This city has long been troubled by difficulties in the way of sewage disposal, insomuch as to elicit the attention of most of her intelligent citizens. The following abstract of a published report, signed by W. F. Knox, Alex. Neilson, F. G. Waterhouse, John M. Milliken and C. E. Grumsky, Committee on Drainage of the Citizens' Association, under date of February 15, 1884, is a document of unusual comprehension and clearness, and eminently worthy of the attention of the civil authorities of all places suffering under similar inconveniences and dangers.

TO THE CITIZENS' ASSOCIATION OF SACRAMENTO.

GENTLEMEN: The question of providing for the city of Sacramento a proper system of sewerage and drainage is one for which the detail of a plan cannot be expected to emanate from your Committee on Drainage.

We have carefully considered in a general way the best method of dealing with this city's sewage and its sewerage system, and we present the result of our inquiries in the form of a series of conclusions. We offer them for your consideration with a full knowledge of the fact that Sacramento at present retains in vaults and cesspools much of the material which ought to be otherwise disposed of; that it now has no adequate means of disposing of the same, even if it were properly collected by a system of pipes or other conduits, and that neither the drainage canal nor Sacramento River can be made a permanent receptacle for the city sewage.

CONCLUSIONS AS TO SEWERAGE AND SEWAGE DISPOSAL FOR SACRAMENTO.

1. As a permanent work, the sewage of the city of Sacramento should be disposed of in irrigation and filtration on land specially prepared for the purpose, which land should be cultivated after the manner of the best examples of sewage farming in other countries.

2. The city should own and prepare for irrigation the land

upon which the sewage is used, and should lease it, with the sewage, on terms which will insure its proper care and cultivation, and the thorough and constant purification of the sewage waters by use therein.

3. Sewage waters alone, and not drainage and rain waters, should be conducted to and used on the land; or, in other words, a system of conduits for collecting only the household and industrial liquids and water-carried waters—excluding the waters from the ground, streets and housetops—should be constructed as a collecting system.

4. A separate system of drainage-way, in the form of street gutters, open ditches or canals, and underground pipes, should ultimately be provided for conducting away the surface and sub-surface drainage waters of the town into the river and into the present drainage canal, if it be permissible to keep this latter permanently open for this purpose.

5. The present lines of sewers should be utilized for this latter purpose of drainage, and not for sewerage.

6. The permanent sewerage-works of the city should be constructed upon a thoroughly studied system, digested in detail and compared with equally well-considered plans prepared for this special case on other systems, if such there be, having reasonable appearance of applicability.

7. As a general proposition, the strictly separate system of sewerage being adhered to in the matter of collecting the sewage, thus far the system of works should consist of pipe-sewers of the smallest practicable dimensions to lead the sewage by gravity flow to a central station; or, perhaps, a number of district stations or depots, whence to be forced through a main outfall-pipe or pipes by direct application of steam power, or indirect application of that power, through the medium of compressed air, sent from a central station to a point of application to the land, as set forth in the first conclusion.

8. As a financial question, the determination even of the proper general system for the main collection and distribution of the sewage—that is, beyond the matter of local collection in small pipes by gravity flow—is a movement not to be hastily made, seeing that this determination will fix, once for all, not only the matter of the first cost of works, but also the cost of maintenance and operation of those works forever afterwards.

9. The question should be so studied in the light of experience elsewhere that we would know not only the probable first cost of several systems, but also that at the rate for the production and application of power which must rule here; we shall know what will be the probable cost of operation under the several systems examined, and in the light of experience elsewhere, we shall know what will be their relative efficiency and cost of maintenance.

10. Having considered the several general propositions to effect the movement of the sewage of the city by gravity flow, and by the application of compressed air, and not having the complete expositions of these systems—as they should be applied in this city—before us, we are unable to determine which method, even in general terms, the citizens and their representatives should favor.

11. As a general proposition, the flow by gravity alone should be utilized to the furthest extent to which it is economical, and only when first cost of works by this method becomes so great as to go beyond the reach of the local exchequer for the time being, or be equivalent to a capitalized amount whose accruing interest exceeds the cost of operation by other methods, should the utilization of this natural force be abandoned and artificial power in any form be resorted to.

12. We are impressed with the advantages presented by the application of compressed air to the movement of sewage, and we think it possible that Sacramento may have to resort to some such system in connection with that of the collection of sewage alone to local stations by gravity flow, as a means of removing her polluted waters.

13. Beyond this general declaration we do not feel justified in going, believing, as a business proposition, that the subject should be fully presented in a thoroughly practical way by persons specially competent so to do before any final decision can intelligently be made.

14. This season is too far advanced to admit of our city's being properly cleaned through the medium of a sewerage system in time to insure a good sanitary condition of affairs before the next heated term and subsequent comparatively unhealthy fall months are upon us.

15. In view of the approach of these times of necessity for

special care, we are impressed with the desirability of immediate action, to the end that all ordinary causes of unhealthful conditions of the air of our city and our houses be removed.

16. Defective house drainage, neglect of cleanliness around and under houses, uncleaned cesspools, unflushed sewers, constitute the chief removable causes for an unsanitary condition of our atmosphere.

17. As a temporary measure demanded for our health and prosperity within the next year, those causes at least must be removed.

18. Until a proper system of sewerage can be constructed, the city should, at cost of each householder, and compulsorily upon him, clean and keep rigidly clean all the cesspools in the town, and should constantly at short intervals flush the sewers and house drains.

For the flushing of sewers there should be direct connections between the water-main, I Street, and the heads of the sewers in Third, Fifth, Seventh, Ninth and Thirteenth Streets (where such connections do not already exist), adequate to thoroughly flush the sewers.

19. The city should rigidly inspect all house drainage appliances, through the medium of a person or persons specially competent by reason of knowledge of scientific house drainage work, and in each case enforce such alterations, additions to, or corrections of, the house drainage pipes, etc., as would insure the most complete protection to the householders possible under the circumstances.

20. Ordinary sanitary inspection of yards and cesspools should be conducted systematically from house to house, missing none, and enforcing proper action on all.

21. This city should act immediately in these matters, upon a set plan of action, and not in a fragmentary and aimless way.

22. Sanitary work has developed into a science having a great range of scientifically deducted rules and practically attained experiences of success and failure recorded in its literature, and no local authority can act for the best interests of its community without the advice in detail of some competent person, who, knowing the results of experiences elsewhere, makes a special study of the case in hand in order to formulate the best means for their application.

23. Sacramento should have the advice of such a person at once as to the best means of meeting the present needs of sanitation, and that the subject of permanent sewerage works should be now taken in hand and a final plan determined upon as soon as possible, so that before another year passes we may have inaugurated work on a permanent basis, or be assured, once for all, that we are not able to do it now.

The report concludes by asking the city Trustees to impose a tax to raise $19,000 for cleansing the drainage canal and cesspools, purchasing excavators, the disposal of sewage temporarily, and meanwhile, for the employment of an engineer to plan a sewerage system in detail. The Committee thank the State Engineer, W. H. Hall, and City Engineer, S. F. Bassett, for valuable suggestions.

TRICHINAPHOBIA.

It is a curious and suggestive fact that while Congress is discussing and deliberating upon the proper measures to be adopted in retaliation for the exclusion of American hog products from the markets of Germany and France, the newspaper press of this country is daily doing everything in its power toward the justification of those powers, by demonstrating the inhibition to be no more than the wise precautions of paternal governments. It does not amend the matter to say that this justification is unintentional on the part of the press. We do not allude to the publication of those cases of trichiniasis which occasionally occur in some portion of this vast country of ours, though we might reasonably object to the undue prominence and sensational head-lines accorded these rare instances of disease. Our reference now is to communications from and "interviews" with that class of scientists and alarmists who are always finding some terrible danger that threatens the dear public. At one time it is the drinking water or beer; at another it is some food adulteration, or some exhalation from a factory that is slowly or rapidly working death and destruction, and, like the prophet in the wilderness, these "scientists" warn us of the "wrath that is to come"—but rarely gets here.

A striking instance of this sort of interview was furnished by a city contemporary, the *Post Dispatch*, a few days ago. A reporter of this enterprising and usually correct journal, in the search of news visited a retired physician who had been devoting a portion of his retirement to the study of trichinæ.

The result of the visit was an "interview," published in a prominent place in the paper, headed with displayed lines stating that *forty per cent.* of the pork sold and used in and around St. Louis was infected with trichinæ! In the body of the article the same statement was made, although elsewhere the informant is made to say that he found in 240 specimens examined 11 infected ones.

The percentage, however, was spelled out "forty," not only in the head-lines, but in the body of the article, and the average reader had nothing to do but accept the statement as correct.

The ensuing day Dr. Frank L. James, who has given the subject as much investigation, perhaps, as any person in this city, sent a communication to the *Post Dispatch* calling attention to these figures, and suggesting that the statement was exaggerated. Dr. James stated that the result of many hundred examinations made by him showed that the proportion of infected meat varied from four to eight per cent., results closely agreeing with those attained by the Chicago Board of Health. This communication brought out a correction from the gentleman first consulted by the reporter, and a declaration that he meant four per cent. instead of forty. Quite a difference indeed! The correction was short, and did not receive much prominence in the paper, but had it been a double-leaded editorial it could not have repaired the damage wrought by the original interview. We have no doubt that within an hour after the appearance of the issue of the *Post Dispatch* containing the statement, marked copies of the paper were in the mails addressed to the proper German and French officials. It is easy to see what assistance has thus been rendered those "paternal governments" in their determination to protect their people against the ravages of the American hog. As a matter of course, we do not believe that either the *Post Dispatch* or the gentleman who gave its reporter the information complained of, had any desire to give aid and comfort to

those who have struck such a blow at one of our great local and national industries, but the result is the same. They have provided, or helped to provide, a valid defense against anything like retaliatory legislation on our part.

Neither the German Chancellor nor the French Minister procured the inhibition against American pork from any real fear of the spiral terror that might be coiled away and encysted in it. They are too wise and well-informed for that. Their action was purely and simply for the purpose of protecting their own pork raisers against American competition, but they made *trichinaphobia* the means of, and the excuse for the exclusion of the American product.

When we take into consideration the fact that pork is almost universally eaten in this country, if we admit that even four per cent. of it is trichinatous, the extreme rarity of cases of death or disease from that cause demonstrates that the dangers of trichinosis have been most grossly exaggerated.

It is a well-known fact that cooking, even though imperfectly performed, destroys the vitality of the parasite and its progeny. We have yet to hear of one single well-authenticated case of trichinosis following the ingestion of cooked pork. The conclusion is obvious.—*St. Louis Medical and Surgical Journal.*

THE CONSUMPTION OF THE FLESH OF ANIMALS AFFECTED WITH EPIDEMIC DISEASES.

During the last few years rapid strides have been made in the investigation of diseases that may be transmitted directly or indirectly from the lower animals to man. It seems to be proved beyond doubt, that foot-and-mouth-disease is communicable by immediate contagion, and also by the unboiled milk of cattle suffering from the epidemic, even when the udders and teats are not visbly affected. With equal certainty outbreaks of enteric fever and other specific disorders incidental to humanity have been traced to the use of milk; although, as has been pointed out to us, it is a moot question whether the milk obtained from infected districts is charged with the poison during the process of secretion, or whether it becomes subsequently contaminated by admixture with impure water. At a quite recent date there was a serious outbreak of enteric

fever in Dundee, which appeared clearly traceable to the milk supply of the locality invaded. From time to time cases have been recorded where persons who have eaten the flesh of animals affected with some epidemic disorder are said to have suffered not only from severe gastro-intestinal disturbance, but also from the more specific manifestations of the diseases.

The statements, however, with regard to the degree of liability to infection from such a source are very conflicting. Taking epidemic pleuro-pneumonia for example, the balance of evidence seems to show that there is almost complete immunity from the chances of constitutional symptoms.

With regard to the splenic apoplexy or braxy of sheep, different opinions have been given. Thus, Professors Simonds and Gamgee assert that pigs and dogs have died within a few hours of eating the flesh of animals dead of the complaint, whilst McGregor, on the other hand, says that dogs devour it with impunity; but inasmuch as mention does not appear to have been made in each case as to whether the meat was cooked or not, the grounds for comparison are not very reliable. One thing seems clear, that no ill results follow the ingestion of such meat by the human subject, provided it is properly cooked, for Scotch shepherds consume it in large quantities, certainly with relish and probably with profit. A few cases are on record in which persons have apparently contracted malignant pustule by eating the flesh of animals affected with splenic fever—a highly specific contagious disease. But here again the negative testimony is very strong the other way. In this disease, the organism—bacillus anthracis—which constitutes the essential *materies morbi*, is very tenacious of life, the spores resisting desiccation and surviving a temperature of 100° C., so that imperfect cooking may not suffice to kill them, but since the contagiousness of splenic fever is so marked, it may be that cases set down as having arisen from the ingestion of meat may very well have owed their origin to inoculation. We have known the flesh of cows stricken with puerperal fever eaten with perfect impunity, and any one who has had experience of English farm-life must be aware that it used to be the exception rather than the rule to bury the carcasses of animals killed to save them from spontaneous death.

There was formerly a widespread and deeply-rooted belief amongst country folks that no harm could come of eating the

flesh of diseased animals if the blood was thoroughly drained from the vessels. The stringency of the laws forbidding the exposure of such meat for sale has to a great extent put a stop to the practice in question, and the opinion is daily gaining ground that very grave consequences may ensue from eating the flesh of animals that have recently suffered from any infectious complaint. If we were in a position to say—which we are not—that enteric fever can be directly transmitted from cattle to man by means of milk, we should have strong grounds for believing that the flesh also might be the vehicle of the contagion.

Although on the whole we take it as not proved that any great danger is to be apprehended so long as meat is well cooked, we must unhesitatingly subscribe to the arguments advanced against the indiscriminate use, as an article of diet, of the carcasses of cattle that have had a specific disease; for apart from the possibility, remote though it be, of contracting by this means such disorders as enteric fever, we know "from general principles that all diseases must affect the composition of flesh, and as the composition of our own bodies is inextricably blended with the composition of the substances we eat, it must be of the greatest importance to health to have these substances as pure as possible." (Parkes). On the other hand, it must not be forgotten that the wholesale condemnation of meat loosely described as "unfit for human food," causes a serious financial loss to the community, keeps up the prices, and to a great extent puts the commodity beyond the reach of the poorer classes.

When it is borne in mind what thorough cooking is capable of effecting, and what a powerfully destructive apparatus the digestive system is, the question arises, Is not the antidote too strong for the bane? It seems a pity that we are not able to determine exactly where the line should be drawn in deciding between meat that is positively injurious to health, and that which, if properly prepared, is conducive to it. As regards the use of meat in a state of putrefactive decomposition, there can scarcely be two opinions, nor can there be much wrong done in proscribing carcasses mottled with trichinæ or cysticerci, but it is well worth serious consideration whether the flesh of animals affected with foot-and-mouth diseases should without exception be cast away.—*The Lancet.*

OHIO STATE SANITARY ASSOCIATION.

The first annual meeting of this Association was held at Columbus, February 15–16. The proceedings opened by the election of Dr. William M. Beach, of London, as temporary chairman. Dr. R. Harvey Reed, of Mansfield, was chosen as temporary secretary. An important object of the meeting was to create a sentiment in favor of the passage of the Scott Bill, to provide for the creation of a State Board of Health, and to provide for the examination by this Board of all applicants for admission into the medical profession, thus placing medicine on a level with law in this particular.

The morning programme was carried out, with the exception of the plea for the organization of a State Board of Health, a paper to be read by Dr. C. M. Finch, President of the Board of Education of Portsmouth. It is presumable that, as he was not present, he was detained by the floods.

In accordance with arrangements, Dr. J. F. Baldwin, of Columbus, delivered an address of welcome, in which he referred to the sad effects of the sewerage system of this State upon the public health, and set forth a number of important topics which he deemed of importance, and which he thought should receive the attention of the student of sanitary science.

The response to Dr. Baldwin's address was made by Mr. John Simpson, Ph. D., Superintendent of the Mansfield Public Schools. He advocated a more thorough and general education in sanitary science, believing that a more widespread knowledge of hygiene would have a wholesome effect on the public health, and would prevent many of the common abuses. "Were a sound body the rule, instead of the exception," he said, "the condition of the race would be materially improved in this age of stupendous progress."

The Chair, at the close of the address, appointed the following committee on permanent organization: Drs. J. F. Baldwin, Columbus; S. C. Scott, Cleveland; E. H. Hyatt, Delaware; G. S. Franklin, Chillicothe; C. A. Lee Reed, Hamilton.

Dr. Beach, of London, the temporary chairman, read an in-

teresting paper on the "Importance of Sanitation." The production displayed an intimate acquaintance with the history of sanitary science. It reviewed at considerable length the history of the plagues that swept over Europe during the middle ages, giving a general idea of their severity, and some of the mediums by which pestilence is spread. Dr. Beach is not in favor of fumigating bedding and other clothes after the poison of pestilence has once been retained in them, but thinks that the physician should enforce positive sanitary precautions by having the articles burned. The history of the custom of quarantining against the epidemics of cholera and yellow fever was run over, and the doctor expressed himself as in favor of it.

Dr. G. S. Franklin, of Chillicothe, read a voluntary paper on the effect of slaughter-houses upon public health, in which he expressed himself as in favor of placing the control of all such institutions in the hands of Boards of Health.

The first thing on the programme for the afternoon was a paper on "Drainage and Water Supply," by Professor E. H. Hyatt, M. D., of Delaware. Dr. Hyatt, however, said that he would willingly give his time to the discussion of the Scott Bill, and the society accepted the offer. Dr. Scott, of Cleveland, the champion of the bill, then took the floor and explained what the bill was intended to do. Each delegate was provided with a printed copy of the bill and could follow the gentleman in his remarks. A spirited discussion followed, the unanimous sentiment, however, seeming to be in favor of the passage of the bill. Those gentlemen taking part in the discussion were: Professor E. H. Hyatt, of Delaware; Dr. Conklin, of Dayton; Dr. McCurdy, of Mahoning County; Dr. Reed, of Hamilton; Dr. Baldwin, of Columbus; Dr. Silver, of Sidney; Dr. Reed, of Mansfield; Dr. Beardsley, of Ottawa; Dr. Beckwith, of Cleveland; Dr. H. J. Sharpe, of London; and Dr. Franklin, of Chillicothe. No one spoke who was not in favor of the bill, but a number of suggestions as to how it might be changed with benefit were offered. Dr. McCurdy feared that too much power might be given the State Board of Health, that they might interfere with the work of local boards in matters of ventilation of public buildings, etc., and with the mine inspector in the matter of ventilating mines. It was the bill, however, which he had seen. Dr. Reed, of Hamilton, sug-

gested, that, as the bill, as now drawn up, provides for a board who shall have the duties and powers of a board of health and of a board of examiners, the matter might be divided and the question of constituting the two bodies submitted separately. This objection and another which was made, were met with the answer that the board of medical examiners would more than meet their expenses, and that part of their expenditures as a board of health would also be covered, thus entailing less cost upon the State than any other board. Dr. Baldwin suggested that it is not desirable to create any more boards than there now are, and that the county infirmary board, receiving pay, could be pressed into service in the local organizations. The infirmary physician could then be utilized as the officer of the board. Dr. Scott raised a counter objection in that county physicians are generally the Cheap Johns of the profession, and would not be desirable in this connection. Dr. Reed, of Mansfield, referred to an objection which he had heard raised against the bill, in that probably the disciples of one school would, if on the board, be compelled to sign certificates of applicants belonging to the other school. He suggested when a new school man appeared for examination, his certificate, if he passed, should be signed by the new school men alone on the board. To this, Dr. Beckwith, of Cleveland, made a perfect answer, saying that he, as a homœopath, was not afraid to stand the examinations of the board, and that he did not desire anyone who was afraid to stand the test to be allowed to practice as a member of his school. He thought such trivial matters as difference in creed should be lost sight of in the broad humanitarianism of the profession. The speech was enthusiastically applauded. Dr. Scott himself settled the matter by saying that it was the object of the bill to have the certificates signed by the president and secretary of the board.

Upon the suggestion of Dr. Scott, a committee was appointed to confer with him at the Neil House after the evening meeting. The committee as appointed was as follows: Dr. Scott; Dr. W. J. Conklin, of Dayton; Dr. Beckwith, of Cleveland; Dr. Beardsley, of Ottawa; Dr. Baldwin, of Columbus; Dr. Beach, of London; Dr. Franklin, of Chillicothe; and Dr. Jones, of London.

The regular programme was then taken up, and Dr. John McCurdy, of Youngstown, read a paper on "Sewerage and Water Supply of Youngstown." The Youngstown people use the Holly water system and main trunk sewers. Mr. James Alison, a delegate from the Master Plumbers' Association of Cincinnati, read a voluntary paper on "The plumber in his relation to sanitary progress as viewed from the College of Practice." The paper was one of the best of the meeting.

The evening session was held in the House of Representatives, commencing at 8 o'clock. There were about one hundred persons present, among them being a number of members of the General Assembly. Dr. Beach took occasion to return thanks for the use of the hall, and called for the first subject of the evening: The opening by Dr. Starling Loving, of discussion on the resolution, "That legalized State sanitation has become a necessity in the State of Ohio for the general protection of its citizens." He held that thousands of deaths occur annually in Ohio from preventable diseases, and referred to the Secretary of State's report to substantiate his statements. These deaths, he argued, were a direct loss of many millions of dollars to the State, and some legislative action should be taken to prevent them. He favored the appointment of a Board of competent physicians to examine all medical college students, and also a State Board to take charge of sanitary affairs.

Discussion of Dr. Loving's paper was opened, and Dr. John McCurdy, of Youngstown, and Dr. Reed, of Mansfield, took part.

Prof W. J. Conklin read a paper on the "Influence of Public Schools on Brain-Building," which did not elicit discussion, from the fact that his statements coincided with the views of most members present.

The second day, the body was called to order about 9 A. M., and the committee on permanent organization made a report, which was adopted. The following officers, nominated by the committee, were unanimously elected:

President, William M. Beach, London; First Vice-President, Prof. Edwin Orton, Columbus; Second Vice-President, Prof. Nelson, Delaware; Third Vice-President, L. D. Brown, Hamilton; Secretary, R. Harvey Reed, Mansfield; Treasurer, John Simpson, Mansfield.

Executive Committee—Starling Loving, Columbus; D. H. Beckwith, Cleveland; W. J. Conklin, Dayton; E. H. Hyatt, Delaware.

On Admission—C. E. Beardsley, Ottawa; John McCurdy, Youngstown; D. R. Silver, Sidney.

On Publication—R. Harvey Reed, Mansfield; J. F. Baldwin, Columbus; George A. Callamore.

On Legislature—William M. Beach, X. C. Scott, Cleveland; C. L. Van Pelt, Toledo; T. C. Minor, Cincinnati; J. R. Flowers, Columbus; C. M. Finch, Portsmouth.

A constitution and by-laws were adopted, stating the objects of the association to be the general advancement of sanitary science, and the encouragement and promotion of local organizations throughout the State. The duties of the officers and the requirements for admission into the society were defined. The membership fee was fixed at $1.

The committee to whom was referred the matter of the bill which Dr. Scott proposes to have submitted to the Legislature, made a report. They met immediately after the Thursday evening session, and considered all amendments which members of the association thought advisable. The bill, however, was changed only in some of its minor details, and these changes were made by and with the consent and advice of Dr. Scott himself. It was unanimously agreed by the association to recommend its passage by the legislature.

Professor Curtiss C. Howard, of Starling Medical College, delivered an excellent lecture on the milk supply of Columbus.

Dr. D. N. Kinsman gave a number of reasons for the establishment of a State Board of Health. He believed that it would be necessary to teach the masses more fully the value of a human life, in order to enlist them in favor of sanitary measures. He thought the local auxiliaries to a State Board would be a powerful help in this work.

Professor C. A. Lee Reed read a paper on the "New Fashion," in which he took strong ground against the present system of education, especially in female seminaries. He thinks that students are crowded with too much mental labor, while their physical training is almost entirely neglected. He favored gymnastic exercises for young women.

Dr. Lewis Slusser, of Canton, read a paper on "Vital

Statistics," the aim of which was to show that, as people become more enlightened, the lease of life is longer.

All the papers that had been presented were then referred to the committee on publication, and a number of letters were read from gentlemen who could not be present. The forenoon session closed with a paper by Dr. Beckwith, of Cleveland, on "Sewerage and Sewer Gases."

In the afternoon, Dr. F. H. Darby, of Morrow, was to present a paper on "Blood Poisoning." He was not present, but the secretary read the production. Professor Orton, of State University, was on the programme for a paper, but by request was excused, and instead gave an informal talk on sanitary science in general. He promised to give a paper at the next meeting of the association. After some remarks by President Beach, the association adjourned to meet in this city some time next February, the exact date to be fixed by the executive committee.

INDIANA STATE SANITARY SOCIETY.

This Society convened according to announcement, March 12, 1884, and continued two days. A special correspondent has kindly furnished us the following abstract of proceedings:

FIRST DAY.—Norbourne N. Shipman, M.D., President, in the chair. Several letters were read from distinguished sanitarians, regretting their inability to be present, but expressing hearty sympathy with, and approval of, the objects of the Society.

Thad. M. Stevens, M.D., of Indianapolis, Chairman of the Committee on State Medicine of the State Board of Health, read an instructive paper on "The Purposes of a State Sanitary Society," which was referred to the Publishing Committee. Discussion of Dr. Stevens' paper and the objects of the convention followed, by Dr. L. F. Hibberd, of Richmond.

A very suggestive paper on "Legislation Concerning the Destruction of Filth" was read by Rev. George L. Curtis, of Jeffersonville. His conclusions, drawn in part from observations and experiences during the recent flood, were suggestive of the terrible effects of filth as a breeder of disease, and the

remedy—cleanliness to be observed and enforced at all times and under all circumstances. It was followed by considerable discussion, endorsing the sentiments of the author, and referred to the Committee on Publication.

Hon. F. J. Van Voorhees, of Indianapolis, presented a very carefully prepared and well-digested paper on "Food and Raiment," his practical ideas on these subjects being clothed in appropriate and emphatic terms, expressing the indispensability of proper food, well and sensibly prepared, and adequate clothing, constructed and worn on common-sense principles, to the preservation of health. The subject matter of this essay was discussed by Rev. Curtis and others, each speaker endorsing the suggestions and commending the hints given—especially to mothers and all who are charged with the care, protection and culture of children. It was referred for publication.

"The Proper Ventilation of Homes and Public Buildings," was the subject of an able and practical essay by Prof. W. S. Haymond, M.D., of Indianapolis. This paper set forth in a very clear light the very dangerous influence and action of impure air on human health, the defects of our homes and public buildings, and the remedy in the proper construction of all buildings intended for human occupancy or habitation on scientific principles, and with a due regard to proper ventilation.

Dr. L. S. Oppenheimer read a paper on "Chest Pressure," prepared by Prof. Thomas Harrison, A.M., of Brownstown, who was unable to attend the convention. This production set forth in strong terms the evils that are the inevitable consequence of tight lacing, and its suggestions may be embodied in the pertinent physiological advice—abandon the baneful practice.

At the evening session Dr. M. L. Boas was called to the chair, and Norbourne M. Shipman, M.D., President of the convention, delivered a very carefully prepared address on "The Proper Way to Teach Sanitation," pointing out the great evils of imperfect sanitation, and the very urgent reasons and necessity for their correction, and suggesting the best means to reach the much-to-be-desired end.

Discussion of the subject followed by Drs. Hibberd, Elder and Butler, each speaker heartily endorsing the sentiments and suggestions of Dr. Shipman, and urging the importance of

proper instruction on the subject of hygiene in our common schools.

Mrs. Virginia L. Oppenheimer was introduced, and read an exceedingly clever paper on "Sanitary Cooking," which was "well done," a palatable "dishing up" of easily digested suggestions as to the best methods of preparing wholesome food, and "spiced" with happy hits at common mistakes and appetizing allusions to well-prepared dishes. It was a "feast of reason," good reasons why all women should be good cooks, and why all young women in particular should learn well the art that is the greatest accomplishment of the successful housewife, and "a flow of soul," the true spirit of culinary perfection.

Full and free discussion of the subject followed, by J. A. Forsythe, Dr. Stevens, Dr. Charlton, Peter L. Carter, Dr. Elder, Dr. Hibberd, Dr. Oppenheimer and M. S. Reeves, all the speakers complimenting the essay for its sound sense and practical suggestions. Incidental to the discussion, the question "How should pork be cooked so as to avoid all danger from trichinosis?" was asked, and the general expression of medical men and others was, "well done."

Hon. Jason B. Brown apologized to the convention for his inability to be present at the opening, and, in a few brief and happy words, welcomed the visiting members to Seymour.

SECOND DAY.—President in the chair. M. L. Boas, M.D., Secretary of the County Board of Health, presented a very carefully prepared survey of the Jackson County Poor House, its structure, accommodations and management, suggesting the urgent necessity for better provision for the accommodation and care of the poor, and particularly for better sanitary regulations. His report showed that at present twenty-six persons—twelve males and fourteen females—were inmates of the asylum, of whom one was an insane veteran soldier of the Mexican war. He was particularly severe in his strictures on the practice of county commissioners in farming out medical assistance at the county asylum and other pauper practice to the lowest bidder, regardless of qualification. This paper was, on motion, referred to the Committee on Publication.

Drs. Butler, Elder, Stevens, Graham and Hibberd entered into a general discussion of the facts and suggestions presented

in the paper, all commending its teachings and its tone, and all urging the necessity of radical reform in the care of the unfortunate, and particularly of the insane poor.

"The Influence of Tobacco and Alcohol on the Human Race" was the subject of a pungent arraignment of these two elements as the prolific sources of a very large and alarming proportion of the physical and mental diseases that curse the human family, as well as the social and financial embarrassment and bankruptcy that is ruining our people. This paper, by Dr. J. M. Moulder, of Kokomo, was remarkable alike for its strong points, its originality, and its independence of thought and expression. On motion, the paper was referred to the Committee on Publication.

Drs. Stevens, Elder, Boas, Graham, Cheatham, Shields, Hervey, Oppenheimer and Rev. E. C. Trimble entered into a very full and free discussion of the paper, and, without exception, the expressed opinion of each speaker was an emphatic endorsement of the thoughts and suggestions of the author.

On motion of Dr. Oppenheimer, the President appointed Drs. Oppenheimer, Butler and Graham a committee to report resolutions expressing the sentiments of the convention on the sudden death, last night (March 12), of Dr. L. P. Yandell, of Louisville.

Dr. E. S. Elder, of Indianapolis, Secretary of the State Board of Health, presented a very comprehensive and interesting paper on "The Objects and Uses of State and Local Boards of Health." The essay was a very clear and suggestive presentation of the history and necessity of these sanitary institutions, and particularly of the origin, work and benefits of local and State Boards of Health in Indiana. It was a fine and able production, and produced a profound impression. The paper was discussed by Doctors Thad. M. Stevens and J. McLean Moulder.

"What the People Should Know About Vaccination" was the subject of an elaborate essay by T. A. Graham, M.D., of Jeffersonville. The history of this sure preventive of one of the most loathsome maladies known to medical practice was traced from its discovery to the present, and the importance of compulsory vaccination was very forcibly presented.

Discussion of the subject matter of the paper was freely and

fully entered into by Drs. Moulder, Oppenheimer, Boas, Elder, Charlton, Orvis, Hibberd and Stevens, the general sentiment being strongly in favor of compulsory vaccination.

Dr. J. W. Hervey, of Indianapolis, read a carefully prepared paper on "The Influence of Habits and Uses on the Public Health," drawing his illustrations from history, ancient and modern, as well as from current events, and presenting in a very clear and forcible way the necessity of correcting evil habits by sanitary authority. On motion, this paper was referred to the Committee on Publication.

OBITUARY.

Dr. L. S. Oppenheimer, Chairman of the Committee on Resolutions, presented the following, which was, on motion, adopted by unanimous vote:

The painful duty devolves upon us to demonstrate our sorrow and sympathy in the loss of a great and noble man. Lunsford P. Yandell is dead. In his death, not Kentucky alone, but this entire country loses a worker in the great field of sanitation, whose promises were just beginning to be fulfilled, whose past was well spent, whose future life foreshadowed much greatness. In commemoration of this sad event, be it

Resolved, That we, the members of the Indiana State Sanitary Society, place amid the joyful records of our first convention the mournful fact of our fallen brother's sudden end, in order to constantly remind us in the future of the old familiar truth. Be it further

Resolved, That we tender our most heartfelt sympathies and condolences to the bereaved wife and children, and brother, and that a copy of the above be sent to them, and published in the late brother's journal, *The Louisville Medical News*, and the Louisville and Indianapolis papers.

(Signed), L. S. OPPENHEIMER, M.D.,
T. A. GRAHAM, M.D.,
D. W. BUTLER, M.D.

Dr. S. H. Charlton, by request, presented a synopsis of his "Sanitary Survey of Jackson County," and, on motion, he was requested by the convention to prepare a full report, and place the same at the disposal of the Committee on Publication.

The evening and closing session of the second day was characterized by a large attendance, showing the increased public interest in the objects of the convention.

W. Cheatham, M.D., of Louisville, Ky., presented an able and comprehensive paper on "Nearsightedness in School Children," illustrating his subject by a number of very fine magic lantern views. The subject matter was original, and its form of presentation was in a style that was at once plain, instructive and entertaining to a very high degree.

Discussion of this paper followed, by Dr. Thad. M. Stevens, A. J. McNair and Dr. Cheatham; and, on motion, it was referred to the Committee on Publication.

On motion of J. A. Forsythe, the hearty thanks of the local organization were extended to visiting members and others, from abroad, for their presence and able assistance in making the convention a success beyond expectation, and exceedingly gratifying to all concerned in the movement; and—

On motion, the first convention of the Society adjourned without day.

MISSOURI STATE BOARD OF HEALTH.

The law requires that every person practicing medicine or surgery, in any of its branches, in this State, shall either present to the Board of Health his diploma for verification or shall pass an examination before the Board.

Diplomas or licenses from legally chartered medical institutions *in good standing*, of whatever school or system of medicine, are to be recognized by the Board of Health, and may be submitted either in person, or by letter, or by proxy; and verification of such diploma consists in the affidavit by the person presenting the same, "that he is the lawful possessor of the same, and that he is the person named therein."

The affidavit may be made before any one authorized to administer oaths, and must be attested under the hand and seal of such officer, if he have such a seal. A fee of one dollar is to accompany each diploma, and in case the diploma is genuine, no other charge is to be made to such applicant; but if it is

shown to be fraudulent, the Board is empowered to charge and collect twenty dollars from the applicant.

Examinations of persons not graduates or licentiates must be made directly by the Board.

They may be wholly or in part in writing, and shall be of an elementary and practical character, but sufficiently strict to test the qualifications of the candidate as a practitioner. Two forms of certificates are issued by the Board of Health—the first to those presenting diplomas or licenses, the second to those examined by the Board; and the Board is required to furnish to the county clerks of the several counties a list of all persons receiving certificates.

Further, every person holding one of these certificates is required to have the same recorded in the office of the county clerk of the county in which he resides, in a book provided by the county clerk for that purpose, and to have the record endorsed upon the certificate. In case of removal to another county, this must be endorsed upon the certificate by the clerk of the county court, and a new record must be made in the office of the county clerk of the county to which he removes.

Usual fees for making the record must be paid to the clerk.

The Board of Health is authorized to refuse certificates to individuals guilty of unprofessional or dishonorable conduct, and to revoke certificates for like cause, after giving the accused an opportunity to be heard in his defense before the Board.

Any itinerant venders of any drug, nostrum, or appliance of any kind, for the treatment of diseases or injury, or what shall, by writing, or printing, or any other method, publicly profess to cure or treat diseases, injuries or deformities, by any drug, nostrum, manipulation, or other expedient, shall pay to the State a license of one hundred dollars per month.

The penalty for violating the other provisions of the act is a fine of not less than fifty nor more than five hundred dollars, or imprisonment in the county jail for not less than thirty days, or by both such fine or imprisonment for each and every offense.

The filing or attempting to file as his own the diploma or certificate of another, or a forged certificate of identification, is made a felony, and equivalent to forgery in the second degree.

By a special proviso of section 12, those who have been prac-

ticing medicine and surgery in this State for five years or more, are exempt from the application of this law.

The responsibility rests upon those who claim the exemption of this proviso to present to the Board of Health satisfactory evidence that they have practiced five years or more. No one is at liberty to assume that, because he has been engaged in practice for five years or more, either with or without diploma, he therefore can ignore the law. The law is general, and upon those who choose to avail themselves of the exception, rests the burden of proof that they come within the exception.

Hence, the Board of Health has a right to expect that every physician who has a diploma will, without delay, present it for verification. Those who have not a diploma from a legally chartered medical institution in good standing, and choose to claim exemption by virtue of five or more years' practice, must present to the Board of Health satisfactory evidence, by affidavit or otherwise, that they have practiced in the State for five years or more, when a proper certificate will be issued in accordance with the facts.—*St. Louis Courier of Medicine.*

BOSTON'S IMPROVED SEWERAGE.

We took occasion in our February number to notice the inauguration of the practical work of Boston's new sewerage system, and to remark that in its main features it is essentially the "West system," which we described in January number, under the head "What Shall be Done with the Sewage?" From a recent number of the *Boston Medical and Surgical Journal* we extract the following description of the Boston system more in detail. It will be remarked that the difference between this and the West system chiefly consists in the final disposal of the sewage, and the works rendered necessary at an enormous cost to this end, instead of adopting the utilization process contemplated by, but not essential to, the West system:

"On the first day of January the new system of intercepting and delivering sewers for that part of Boston situated between the Charles and Neponset Rivers, which has been in construction for a number of years, was inaugurated.

"As the growth of the city demanded, sewers were built years ago, each emptying at a locality most convenient and least annoying. According to the new plan, a series of intercepting sewers has been constructed, belting the city and communicating with the older sewers near their mouths by means of small branches or connecting sewers, provided with gates to regulate the flow. The old outlets are, for the most part, kept open, to be used as storm overflows, and those below tide level will be provided with a double set of gates to prevent the tide from flowing in. The great bulk of the sewage is, however, by the new system, to be conveyed to a considerable distance from the shore, and deposited where, it is believed, and thus far proved, that it will not be obnoxious or injurious. The various intercepting branches converge into one main sewer, which runs in nearly a straight line to old Harbor Point, Dorchester, where there is a pumping station. At this point extensive works have been erected—the first is a filth-hoist, through which the sewage passes before it reaches the pumping station. The filth-hoist consists of two chambers, in each of which are hung so as to be raised and lowered by winches, open cages through which the sewage flows, and which retain any large floating object that would injure the pumps. They are arranged in pairs, one behind the other, so that one may be in place while the other is drawn up for cleaning.

"Four engines, each of a capacity to raise 25,000,000 gallons in twenty-four hours to a maximum height of forty-three feet, are now in position, and it is designed eventually to double this pumping capacity, allowance having been made for two boiler houses.

"The outfall sewer extends from near the engine-house to the reservoir on Moon Island—a distance of a little more than two and a half miles. The first portion of the outfall sewer, a section of 1,200 feet, is the deposit sewer, which is carried into Dorchester Bay on an embankment; the second portion, having a horizontal length of 6,970 feet, is the tunnel in the bay, in the form of an inverted siphon, at whose entrance is a vertical descent of 150 feet, the level being regained at the farther end by a rise of one foot in six; the third portion extends from Squantum Neck, on the farther side of Dorchester Bay, to Moon Island, where it connects with a reservoir having four

compartments with a total capacity of 25,000,000 gallons, from which the sewage is discharged at ebb tide into deep water by an outlet sewer.

"The total estimated cost of these sewers for the south side of Charles River, including an allowance of $300,000 for rebuilding and connecting old sewers, was placed in 1876 at $3,750,000. The actul cost has been thus far about $4,500,000, and $750,000 more will be needed; but much of the work proved far more difficult than was expected, and several contractors met with serious losses. The important thing is, that the work seems to have been well done, and the system to practically answer the expectations that were formed of it. For the district on the north side of Charles River, a main sewer and branches of fifteen miles' length, with other works, at a cost of more than $3,000,000, will be required, but are not yet contracted for.

"In addition to relieving the waters of Charles River and its flats, which had become extremely offensive, the present sewers, providing for a constant and uninterrupted flow of sewage from its entrance to the outfall sewer, deliver the city from the cesspool tendency of the old sewers; whether the level of the ground-water will be lowered, as was at one time anticipated, it is as yet too early to determine.

"It will be easily seen that, with the surface drainage of the city and the great consumption of water—between ninety and one hundred gallons per head daily—the sewage, when reaching Squantum or the reservoir on Moon Island, will be extremely dilute, yielding but a small percentage of solid constituents, and those of a soluble character. It is not reasonable to anticipate any annoyance from its discharge into deep water on an ebb tide, either to those navigating this outer portion of the harbor or to those occupying neighboring shores; the full sewage product of the district drained is not as yet discharged through the intercepting sewer, but of the large amount which is discharged all trace is dissipated in the ocean, even more readily than was anticipated. Whether any other disposition could be advantageously made of this sewage when once delivered at Squantum or at Moon Island, is a subject whose discussion we reserve for another occasion. Enough is already known, however, of the working of the present system, to permit us to say

that those who designed and executed it deserve well of the city, as will doubtless be evidenced in due time by a diminished death-rate, and more immediately by a relief of offended senses."

MORTALITY IN THE ARMY AND NAVY OF FRANCE.

For France and for Algeria the mortality in the army is 8.65 per 1,000 men.

In the navy 18.9 per 1,000 men; in Martinique, 32.2; in Guadeloupe, 34.5; in Senegal, 140.6; at Réunion, 20.9; in New Caledonia, 28.1; and in Cochinchina, 97 per 1,000.

These figures are the average for the last eight years, from 1873 to 1880 inclusive. They have been found by comparing the total of the effective service with the number of deaths. In the number of deaths is included those who died in the hospitals in France after they had been sent home disabled.

The average of the deaths among marines in the service in all stations from these figures is 70.7 per 1,000.

Among the officers in the army the mortality is only 6.81 per 1,000, while among the officers of the navy it is 59 per 1,000,

These figures, taken from the "*Journal de Médecine de Paris*" for December, 1883, are very suggestive to all interested. The excessive mortality in the naval branch of the service cannot depend on climate alone, for in most of these stations garrisons from the army are stationed. It must depend then upon general unhygienic conditions: food, sleeping apartments, infection lurking in ships, and the like. Is there any remedy for such conditions? If there be it seems that humanity and economy should combine to discover the means. These men abandon home and family relations and give their lives to their country. Are they not worthy of better treatment? Their prospects for life are blighted; they spend the best years of their existence serving the public, and are allowed to die as if a price was set on their heads. Cannot these ships on board which they serve be cleaned? Can they not be regularly overhauled as every well-managed dwelling is examined at regular intervals from cellar to garret and thoroughly cleansed? Cannot the filth which has accumulated during years of neglect be re-

moved, so that men can sleep without inhaling the foul gases arising from organic matter in process of decay?

Is it customary on board ship to clean only the decks, to keep the rigging in perfect order, to have the steam engine and everything that meets the Captain's eye bright and glittering, but allow the men to sleep and mess in filth? Many of them must be worse than the cellars of the filthiest tenement houses which nobody has thought of cleaning for years. They must be literally "whitened sepulchres." But the men, as will be seen from a careful reading of the figures, are not the only sufferers. The foul emanations from concealed filth will seek and will find the apartments of captain and other officers.

Will somebody do something to correct this criminal negligence? Must valuable lives continue to be sacrificed because officers are wedded to customs that existed two centuries ago? But the facts speak eloquently to those who will listen.

T. P. CORBALLY.

THE PREVENTION OF PUERPERAL FEVER.—With regard to prophylaxis, I think too great a burden could be thrown upon the practitioner by insisting upon non-essential details. My experience does not entitle me to expect great results from washing the floors, walls and furniture with antiseptic solutions. At least in the lying-in hospitals, where I have witnessed many epidemics of puerperal fever, there has been a time when everything was vigorously scrubbed; no pictures adorned the walls, no carpet decked the floor, and carbolic acid was used without stint, but I have never observed that these precautions exerted the slightest influence in the prevention or the stamping out of puerperal fever.

The fumes of sulphurous acid have since been substituted for the old-time scrubbings with the best results, and I would strenuously recommend the modes of disinfection employed by the Board of Health in all cases where there has been previously scarlatina, diphtheria, typhoid, or erysipelas in the household. In this conection, I would state that a woman ought never to be confined in the chamber adjacent to the bath-room, as I believe that puerperal women are extremely sensitive to sewer-gas poisons.—Prof. Wm. T. Lusk, in the *New York Medical Journal*, Feb. 16, 1884.

THE HYDRA.

Medical science is so closely connected with natural history, that this short page of it may interest some of your medical readers. Most of them, no doubt, have admired the magnificent and elegant shapes, the wonderful coloring of the large sea anemone, and my present subject, the fresh water hydra, belongs to the same class. Polypi (from *poly*—many, *pes*—feet), are so-called from their resemblance to many armed octopus or cuttlefish. Large polypi are citizens of the ocean; of those living in fresh water the hydra is the only one plainly visible to the naked eye. A tiny speck of jelly unfolds itself gradually in the sunlight to a stalk, carrying six arms or tentacles, presenting to the observer an object of incredible magnificence and beauty. As soon as one of the tentacles touches an animal it forms a complete lasso or sling, and moves its prey slowly to the cavity in the centre of the case or stalk, occupying the whole interior of the body, and engulfs it gradually. The transparency of the hydra permits one to follow the process completely. The other tentacles keep on ad interim to hunt for more food. The vitality of zoophytes in general is remarkable; they may be turned inside out or have pieces cut off without interfering with their economy or comfort.

Their mode of reproduction is unique and singular; no sexual organs have been discovered. Small, bow-like processes make their appearance and develop gradually into complete hydræ. Each of these soon provides for its own wants, even when still attached to its parent. A canal of communication from the hydra to its offspring closes after a few days, but the young may remain attached for some time after. Frequently a hydra will lasso a smaller one, swallow it and disgorge it again intact and sound. Hydræ in the aquarium attach themselves to the glass sides, offering a splendid chance for observation of their construction and habits. There are three species of these interesting animals enumerated: hydra vulgaris, viridis, and fusca.

I could never discover any other difference than the color, and this likely depends merely on the food within their reach.

BROOKLYN, Feb. 15, 1884. L. BRANDEIS.

EDITOR'S TABLE.

THE NATIONAL BOARD OF HEALTH BEFORE CONGRESS.

On another page will be found "A Bill to Protect the Public Health," introduced since the one published in March number to "Amend the Act to Prevent the introduction of Infectious and Contagious Diseases," etc. The one published in this number has a misleading title. It should be: A bill to obstruct commerce by measures promotive of infectious and contagious diseases, under the special direction of the Supervising Surgeon-General of the Marine Hospital Service—for this is its purport. But under the light shed upon the results of the Supervising Surgeon-General's service, in the exercise of his temporary functions for the last two years, as displayed in his official report, reviewed on other pages of this number; and by the reports of evidence before the Committee on Public Health of the House of Representatives, in support of House Bill 2,785, Forty-eighth Congress, First Session, for the protection of the Public Health, and in refutation of charges made against the Board by the Supervising Surgeon-General of the Marine Hospital Service, which we have just received, too late for such a notice as the importance of the subject demands in this number, a further criticism of this bill in behalf of the Supervising Surgeon-General is unnecessary. It will suffice for the present to state that the evidence of the present Supervising Surgeon-General's total unfitness for the exercise of the office which he covets is simply overwhelming.

It is probably quite unknown to our readers that a discussion has been going on for some weeks before the Public Health Committee of the House of Representatives as to the merits and demerits of the National Board of Health. The reports we have before us contain the several arguments presented to the committee, and we are in a position to judge of the nature of the controversy. It is in substance this: For some two years the Board has found itself obstructed by the opposition of two or three members of the lower House of Congress, who who were in positions on the Committee on Appropriations, to

exercise a controlling influence over the appropriations for the Board. For a time the origin of this opposition was unknown to the Board, but at length a member of the House, Mr. Ellis, of Louisiana, who was making charges against the Board, let out the fact that he got the data of his speech from Dr. J. B. Hamilton, the head of the Marine Hospital Service—one of the branches of the Board itself. At once it became apparent that all the opposition to the Board had its source in a conspiracy that for a long time was being secretly organized by the head of the Marine Hospital Service, Dr. Hamilton, in connection with Dr. Baillache, an officer of that service, detailed to act as a member of the Board, and Assistant Secretary French, of the Treasury Department.

When we consider that by the law organizing the National Board, the Marine Hospital Service was to be equally represented in it, with the Army, Navy and Department of Justice, and hence was bound in good faith to aid and support the Board in its work, the baseness of this treachery becomes apparent. For four years the Marine Hospital Service has occupied a seat in that Board and in its Executive Committee, and has always as cordially sustained the work and policy of the Board as any member. And yet it appears from Dr. Hamilton's statement that while he was cognizant of great errors in management, of expenditure of moneys for corrupt purposes, and of numerous defects and delinquencies, he never seems to have attempted to correct or improve the methods of the Board. On the contrary, while his service, through its representative on the Board, is aiding and co-operating in these alleged wrongs, Dr. Hamilton secretly manipulates the records of the Board, extracts such statements as he can best employ to prejudice the minds of members of Congress, and, finally, brings them before the Public Health Committee with an amount of self-conceit, personal abuse of members of the Board, and general clap-trap which has never been equaled. If such stuff as he has issued under the cover of the Treasury Department shall have any other effect than disgusting the Public Health Committee, we despair of any correct health legislation by the present Congress.

We shall recur to the subject in our next number, with some of the most important evidence in detail.

ARE PHYSICIANS ESSENTIALLY SANITARIANS?

We venture to raise this question, in view of a report that a physician in Washington, D. C., has been sued for $1,000 damages for failing to take measures to prevent the spread of a contagious disease in the family of the complainant. A contemporary raises the question as to whether it is the function of the physician to prevent disease, and says that if it is, he should certainly be remunerated for such service; and holds that a physician is undoubtedly called upon to do all he can to stay the progress of contagious disease; but for such services he should also make charges, and be enabled to collect them. Certainly so, if he is called in for that purpose; but calls of this kind are so rare that it appears to us physicians can hardly be held responsible for the exercise of this function unless the purpose of the call is so specified. Preventive Medicine is at best only taught elementarily in a few medical colleges, and in these as an *addendum* to some other subject deemed to be more important—in none systematically as a prerequisite to graduation. Yet within recent years the essential nature, the natural history and the exciting causes of disease, and the means of prevention, have opened up a sphere of study far more extensive than any one of several of the many branches into which medicine is now divided and taught. Hence, a practical knowledge of the subjects embraced under the head of Preventive Medicine has become a special qualification based upon special opportunities and a course of study *not* provided by medical colleges. It appears to us, therefore, exceedingly doubtful whether a physician engaged in the ordinary course of his practice—the treatment of disease—can be held responsible for the neglect of a subject not deemed essential to his profession. That it *should* be, that no medical college faculty should be considered complete, or chartered, without provision for instruction in Preventive Medicine, we thoroughly believe.

THE MATHEMATICS OF VITAL STATISTICS.

It is the misfortune of our State Boards of Health that the executive officers, respectively, are made the State Registrars of Vital Statistics. The consequence is that the registration of births, marriages and deaths appears to be regarded by most of them as their chief field of labor; while practical sanitation

—the investigation of the causes and the prevention of disease are neglected. It is far from our purpose to call in question the value of such registration to the State, but as we have repeatedly heretofore had occasion to remark, it is clerical work, devolved for the most part upon clerks who have no technical education; and no matter what the forms of nomenclature before such clerks, their want of familiarity with the signification of the terms used, in conjunction with an almost equal degree of incompetency—nonconformity, at least—of many physicians who certify to the causes of death, render all such registrations valueless for scientific purposes. For illustration, we are privileged to use the following abstract of returns for a brief period, supplied by Mr. A. R. Carter, the accomplished Secretary of the Health Department of Baltimore:

BOY, AGED 10 YEARS.—"Primary cause, Dropsy of Brain from Infancy." Immediate cause, "Head the size of any wooden water bucket."

CHILD, AGED 10 DAYS.—Primary cause, "Mother far advanced in Phthisis Pulmonalis. Immediate cause, "Child born with Marasmus, with slight hopes of living, found dead in bed."

CHILD, AGED 4 YEARS.—Primary cause, not given. Immediate cause, "Eating a heavy piece of apple pie four hours before death."

LADY, AGED 85 YEARS.—Primary cause, not given. Immediate cause, "Euthanasia."

This physician, when asked for a correct diagnosis, gave the cause "Old Age," adding that "Euthanasia was correct, Webster's unabridged dictionary to the contrary notwithstanding."

LADY, AGED 80 YEARS.—Primary cause, "Fall from a third story window." Immediate cause, "Seeing it was a fatal case, I let her die in peace, which she did in one hour and twenty minutes."

MAN, AGED 45 YEARS.—Primary cause, "Inflammation of the intritins or bowels." Immediate cause, "Enterits."

WOMAN, AGED 58 YEARS.—Primary cause, "Choeleria Infants." Immediate cause, "Choeleria Infantum."

This gentleman when asked about the above certificate said, "I don't see why a woman can't die of the same disease as a baby; her bowels gave way." And when reproved for his bad orthography, retorted by saying, "I wasn't brought up at the feet of Gamzell! but I know how to treat disease." Doubtless he was thinking of St. Paul sitting at the feet of Gamaliel. His last effort was the following:

MAN, AGED 45 YEARS.—Primary cause, not stated. Immediate cause, "Histeritis."

I sent Dungleson's Dictionary, revised edition, to him, with one of our officers, to let him see that Histeritis was Metritis, and that a man could not have such a disease. He very coolly told the officer that my books did not agree with his; that he was correct, and that "the man died of that disease, because he couldn't keep nothing on his stomach." This fellow has a large practice, a *big* diploma, and also a certificate from a prominent medical society that he is fully qualified to practice medicine.

The Secretary well asks: "Is it not about time that our Legislature should take some action and pass some good laws 'regulating the practice of Medicine'?"

The same degree of incompetency might be added by an abstract from the tabulated numerous boards of health in their efforts to clasify synonymous terms, and their attempts at conformity with the requirements of the State boards of health regulation tables.

Equally fruitless are the efforts of some men of science, who attempt to deduce practical conclusions in regard to life expectancy from the results of unsanitary and dangerous conditions as fixed factors, in the causes of death. We have a prominent example of this in a pamphlet,* reviewed in a recent number of *The Indicator*, by Mr. M. W. Harrington. "In the first part we have a discussion of the curves representing the number of living and probability of dying, taken from Brune's table. The characteristics of the curves are pointed out and empirical equations are deduced to represent them. This part gives a practical application of his theory by deducing the probability of dying at each age from the table above mentioned.

In the first part the author pointed out, in passing, the propriety of making use of the method of least squares, and then dismissed the subject by saying the reader could easily try it for himself. He does not seem to have tried it himself until after publication, and when he tried it he found it would not work. Before he could employ this method he had to add a new theorem to this abstruse branch of mathematics, and this he has successfully done in his second part. In the third part he applies his improved theory to the English Experience Table

* Das mathematische Gesetz der menschlichen Sterblichkeit, by Prof. Theodore Wittstein, Ph. D. Second edition, enlarged. Hanover, 1883.

of 1869 with satisfactory results, and in an appendix he gives the formulæ employed for computing values dependent on lives by the Hanoverian Life Office, and a table of reciprocals from 0 to 999. The whole makes a contribution to this branch of science, which deserves to be in the hands of actuaries and statisticians, and also in those of students of pure mathematics.

The feature of greatest general interest deduced by Prof. Wittstein is the form to which he reduces the equation which represents the probability of dying. It is as follows:

$$W = a^{-(M-x)^n} + \frac{1}{m} a^{-(mx)^n}$$

In which

W=Probability of dying;

M=Highest age of the table, which for the author is in one case 96, in the other 97.

a, n and m are constants.

Expressed in common language it simply means that the probability of dying at any age depends upon two independent things. That is:

Probability of dying=First thing + Second thing.

This differs from preceding authors who have believed that the dependence was on two things, but that they were not independent. That is:

Probability of dying=First thing × Second thing.

The tests applied by the author really indicate that his form is an improvement on the old.

What are the two things on which the probability of dying depends? The author thinks that the first is physiological, and depends on the ageing of the machinery of life. As the individual grows old his senses fail him, his organs degenerate, and his organism gradually becomes incapable of fulfilling the requirements of life. In this all students will agree with the author. This cause of death is so self-evident that it has been mathematically recognized for half a century.

STATE BOARDS OF HEALTH REPORTS.

CALIFORNIA.—Twenty-six localities report 633 deaths for January, 1884, or at the annual rate of 18.72 per 1,000 of population. This result is 0.11 higher than the same number of local-

ities gave for December, 1883. In that month the annual death-rate of San Francisco, its population being estimated at 250,000, was 20.11, and that of the other towns, aggregating a population of 114,000, was 18,096. In January, 1884, the figures would read, for the former, 20.73, and for the latter, 15.49—a population of 155,600 being represented.

Consumption presents, as usual at this season of the year, a large mortality, falling heavily upon localities which, having more or less reputation as sanitary resorts, have attracted many unfortunate sufferers with this disease for the winter season. By the acute diseases of the pulmonary organs we have 87 deaths, or about 0.02 of the total.

Of the contagious diseases, diphtheria is responsible for ten deaths from five localities. Measles is mentioned in the reports from Lakeport, Oakville and Modesto. Of the latter, Dr. Evans states that "measles is epidemic in one school district, arising from one case in school." Scarlatina is reported in the death record, with four deaths from three localities, and in the "sickness reports," as having occurred, besides, in Dixon. A number of cases have occurred in Sacramento, generally of mild form. Cerebro-spinal fever appears, with six deaths in five localities; and Dr. R. F. Rooney mentions one additional at Newcastle—there having been three cases thus far. Typhoid fever gives twenty-eight deaths in five localities. This disease is reported on the "sickness cards" from Williams, Vallejo and Healdsburg, in addition to the five localities reporting deaths.

CONNECTICUT.—For the month of January the Secretary reports that, with the exception of Hartford, the sanitary history of the month is exceptionally good. The highest death-rate is 16, the percentage of zymotic diseases not large, nor the percentage of deaths of those under five. The increase in the relative frequency of typhoid fever over malaria is shown by the ratio of deaths, 14 to 5.

The death-rate of Hartford is not materially decreased from that of December. The ratio of deaths from zymotic diseases and of infantile deaths, also continues unfavorable. The mortality from diphtheria continues at the same rate it has steadily maintained since November—a little over 20 a month—and thus far in February the ratio has been the same. In 1883 there were 200 deaths from diphtheria, 234 from croup and diphtheria, now generally classed together.

Typhoid fever is reported from Berlin, also from Willimantic —one case fatal. Diphtheria and scarlet fever are also reported, with one death from each from the latter place, and also measles as very prevalent. Measles is also reported from Ashford and Saugatuck, and as epidemic in Willington and Stafford. Whooping-cough is reported from Bloomfield, Hampton, Union, Thomaston, Saugatuck, South Manchester and Avon, but not unusually severe. Scarlet fever is more prevalent than last month. Cases are reported from New Caanan (one fatal), Robertsville, Westport, Greenwich (one fatal), Berlin and Haddam, and as quite prevalent in North Haven. From Dr. Griswold, of North Manchester, five cases in two families, of a very malignant type, are reported (three of which were fatal) in a neighboring village. The doctor's opinion was, that the infection was conveyed by paper rags.

Diphtheria is reported from Manchester, Thomaston, Avon, New Canaan, Hampton, Westport, Berlin and Bloomfield—six cases, two of which were fatal. The only death from whooping cough is also reported, but the cases were quite numerous.

Diseases of the nervous system have been unusually prevalent. Erysipelas is also reported much oftener than usual.

While lung fever is reported as prevalent quite generally, the indications are that the mortality will be prolonged into the spring months, as has been the case of late. Bronchitis is also more prevalent than usual.

One singular feature is the unusual prevalence of diarrhœal diseases. Should this continue it would be an intimation to look out for cholera next summer. It is a bad time to clear up filth when an epidemic is present. The time, if prevention is to be accomplished, is before the appearance of the disease.

IOWA.—The Second Biennial Report of the State Board of Health, for the fiscal period ending June 30, 1883, is a document of 417 pages, which exhibits the results of a great deal of industry and much effectual work for the promotion of the public health. It opens with extensive correspondence with the National and State Boards of Health in connection with the effort to stay the progress and stamp out small-pox through the exercise of *advisory* power only—the Board having no other—and herein fully demonstrates the necessity for the man-

datory power, which it urges upon the Legislature, for the proper exercise of its important duties. It contains proceedings in detail of the several quarterly meetings of the Board, reports of local boards of health, of contagious diseases, special correspondence, etc., and stated papers on Ventilation, by Justin M. Hull, M.D., member of the Board; Hospitals for Contagions, and their Proper Location, by R. J. Farquharson, M.D., Secretary of the Board; Geology and Topography of Iowa in a Sanitary Point of View, by P. J. Farnsworth, M.D.; and the Treatment of the Drowned, adopted by the Board and printed for general distribution. The papers of Drs. Farquharson and Farnsworth have been published in full in previous numbers of THE SANITARIAN; they fairly illustrate the character of the other stated papers in the volume—all show extensive research and eminent practical knowledge.

First Registration Report for the year ending October 1, 1881, is a volume of 811 pages, almost wholly statistical. The population of the State, as given by census of 1880, is 1,624,615, showing an increase of 430,595 over the census of 1870; this ratio of increase is adopted by the Secretary as a measure of increase for succeeding years since the census, but no addition is made for this report, year ending June, 1881.

Marriages reported (incomplete), 12,795—ratio per 1,000 of population, 15. Massachusetts, with nearly the same population (1,783,085), records 15,538—17.42 per 1,000.

Births recorded for the year, including 905 still-births, 29,397—18 + per 1,000. Massachusetts, for the same period, recorded 46,811 (including 1,297 still-births)—25.53 per 1,000.

Deaths recorded, 10,668. "How far this falls short of the true number the following will show:

1. It gives . . . 6 per 1,000 of the living.

2. Massachusets, for nearly the same period (1880) . . . 3,592—19 per 1,000.

3. The United States census for 1880 (ending June 1), . . . total deaths, 19,377, to which should be added 33 per cent. as omitted . . . 25,836—16 + per 1,000." From which it is inferred that not more than 45 per cent. of the deaths were reported.

Of the causes of death, over 5 per cent. of the total number were not given, or too indefinitely for classification. This item of incompleteness is also illustrated by comparison with Mas-

sachusets, where it is 2 + per cent., and with the United States census, 3 +.

By classification, the percentages of the deaths reported, from all causes, were: From zymotic diseases, 2.34; parasitic diseases, 0.004; dietetic diseases, 0.047; constitutional diseases, 0.85; developmental diseases (not including 905 still-births), 0.37; local diseases, 2.24; violent deaths, 0.33; ill-defined causes, 0.35. The most fatal diseases which prevailed during the year were consumption and diphtheria, from each of which there were 917 deaths. From scarlet fever, 467; malarial diseases, 409; typhoid fever, 372; cerebro-spinal fever, 264; whooping-cough, 185; measles, 58; small-pox, 22. The elaborate tables in detail of population, nativity, race, ages of the deceased, the causes of death, etc., show a great amount of labor, and a fruitful source of profitable information in social statistics.

MICHIGAN.—For the four weeks ending March 1, 1884, the reports indicate that for the week ending February 9, typhoid fever increased, there being in that week 14 cases reported; the following week it decreased to half that number, and for the week ending March 1, to 5. For the first three weeks of the period tonsilitis, intermittent fever, remittent fever, diarrhœa, measles, scarlet fever, influenza, bronchitis, pneumonia, rheumatism, and inflammation of the bowels increased; for the last week there was, for the most part, a decrease of these affections. Of diphtheria, the reports show for the four weeks, respectively, 19, 14, 15 and 17.

Compared with the average for the month of February in the six years 1877-1882, neuralgia was more prevalent, and pneumonia, diphtheria, bronchitis, remittent fever, typho-malarial fever and rheumatism were less prevalent in February, 1884.

For the month of February, 1884, compared with the average of corresponding months for six years, 1879–1884, the temperature was lower, the relative humidity was more, and the absolute humidity and the day and the night ozone less.

STATES BOARDS OF HEALTH ORGANIZATION.—At a meeting of the representatives of the States Boards of Health, in Detroit, last November, initiative measures were taken to

formulate a general plan of practical work with a view to the organization of a "section" devoted to State Board work in the American Public Health Association, or the formation of a separate organization specially adapted to the needs of State Boards of Health. Dr. Henry B. Baker, of Michigan, and Dr. J. N. McCormack, of Kentucky, were appointed a committee to confer with and secure the co-operation of all the State Boards in the accomplishment of this purpose; and Drs. C. W. Chamberlain, of Conn.; I. E. Reeves, of W. Va.; and and Stephen Smith, of N. Y., were appointed a committee on organization. After a full correspondence, the committees have sent out a circular letter inviting the appointment and a conference of delegates from all the State Boards, to meet in Washington on the second day of the meeting of the American Medical Association, May 7, 1884.

SUMMER FEVER NESTS.—Our esteemed contemporary, the *American Architect*, invites attention to the sequel of the Seabright Hotel, N. J. where, last summer a New York gentleman was compelled to pay the landlord of the hotel in which he was staying twenty-five hundred dollars to prevent his wife, ill with typhoid fever contracted in the hotel, from being thrust out of doors, sued to recover the money, as having been extorted from him by force, has just been tried.

The testimony, which was taken some time ago, was anything but favorable to the landlord, but the jury could not agree after five or six hours' deliberation, as to whether he ought to pay back the money or not. Whether the case will be tried again remains to be seen, but we hope that the matter will not be allowed to drop.

If it is to be lawful for American hotel-keepers at intervals to fall upon their guests and torture them until they pay an enormous ransom, the rest of the world ought to know it. This notice is timely, and it should serve as a warning to persons in search of summer resorts. It should make them mindful of pitfalls and fever nests unfortunately common to such places; and if they are wise they will require evidence to the contrary by a competent sanitary inspector before subjecting themselves to the chances.

MORTALITY STATISTICS IN THE UNITED STATES.

FOUR WEEKS, ENDING FEBRUARY 23, 1884. Correspondents under this head are requested to send reports promptly.	Total Deaths.	Deaths under 5 years.	Lung Diseases.	Diphtheria and Croup.	Scarlatina.	Measles.	Whooping Cough.	Fevers.	Small Pox.	Diarrhœal Diseases.	Annual rate per 1,000.
Burlington, Vt., 11,364	8	4	3	..	..	..	..	..	..	..	9.0
Boston, Mass., 427,940	713	232	251	35	20	1	6	11	..	20	21.6
‡Lowell, Mass., 70,000	105	38	27	3	..	..	1	3	..	6	18.0
Lynn, Mass., 38,284	46	13	11	2	..	..	..	..	..	..	15.5
Somerville, Mass, 28,663	33	7	14	..	..	..	..	..	..	2	14.8
Worcester, Mass., 58,295	96	33	26	5	2	..	1	2	..	..	21.4
‡Providence, R. I., 120,000	171	50	64	9	..	..	..	5	..	1	17.1
‡New Haven, Ct., 72,000	107	31	25	6	5	..	..	2	..	..	17.1
New York, N. Y., 1,325,092	2496	941	883	136	57	38	22	75	..	51	23.9
Brooklyn, N. Y., 624,118	927	357	331	48	22	12	9	13	..	10	18.7
Buffalo, N. Y., 155,159	..	..	..	..	..	..	..	..	..	..	....
Rochester, N. Y., 101,900	99	23	31	3	..	2	1	2	..	..	12.4
Albany, N. Y., 90,903	141	46	32	9	6	..	2	1	..	2	20.0
‡Auburn, N. Y., 25,000	29	9	7	2	..	..	..	4	..	..	15.0
Yonkers, N. Y., 21,000	26	6	3	2	..	..	..	..	..	..	15.3
West Troy, N. Y., 13,000	13	6	5	5	..	..	..	..	..	..	13.0
Hudson Co., N. J., 209,000	323	107	96	15	7	..	1	6	..	6	18.7
Paterson, N. J.	..	..	..	..	..	..	..	..	..	..	....
Philadelphia, Pa., 927,995	1618	578	436	86	85	15	6	62	2	10	22.5
Pittsburgh, Pa., 180,000	240	93	97	9	5	..	2	12	..	..	17.2
Erie, Pa., 27,730	34	12	9	3	..	..	..	2	..	..	15.8
‡Wilmington, Del., 51,500	78	33	18	2	3	2	..	..	..	..	18.0
Cincinnati, Ohio, 280,000	369	129	110	11	6	..	..	15	5	9	17.1
Cleveland, O., 200,429	205	85	42	28	1	..	..	6	..	2	13.5
‡Toledo, O., 52,000	67	27	21	2	2	..	4	1	..	..	15.3
Detroit, Mich., 135,000	208	92	39	30	7	2	..	5	..	..	20.1
†Indianapolis, Ind., 100,000	54	25	18	2	..	2	..	1	4	..	14.0
Evansville, Ind., 40,000	47	18	20	..	1	..	2	1	1	..	15.2
Rock Island, Ill., 11,650	9	5	..	2	..	..	..	3	..	..	9.9
‡Chicago, Ill., 580,000	792	365	203	51	29	2	5	40	..	11	16.3
St. Louis, Mo., 400,000	599	228	204	62	9	2	3	18	2	16	19.4
Milwaukee, Wis., 130,000	172	85	32	14	9	..	..	2	..	1	15.4
Omaha, Neb., 45,200	..	..	..	..	..	..	..	..	..	..	....
Salt Lake City, Utah, 22,000	46	8	6	2	..	..	..	1	..	..	24.1
San Francisco, Cal., 235,000	..	..	..	..	..	..	..	..	..	..	....
Minneapolis, Minn., 90,000	98	42	25	16	4	..	1	..	..	1	14.2
‡St. Paul, Minn., 42,000	78	30	21	9	1	..	1	4	..	1	22.8
Baltimore, Md., 408,520	672	278	266	41	9	39	4	18	..	6	21.3
Dist. of Columbia, 194,910	425	163	158	7	21	33	5	4	..	4	25.4
Richmond, Va., 66,000	141	54	41	1	..	1	4	5	..	4	23.8
Lynchburg, Va., 20,240	44	19	14	1	1	..	1	1	..	..	56.7
§New Orleans, La., 221,084	140	31	42	2	..	3	1	3	17	4	31.1
‡Nashville, Tenn., 50,000	..	..	..	..	..	..	..	..	..	..	....
‡Mobile, Ala., 31,295	91	21	30	..	..	..	..	5	..	2	34.9
Jacksonville, Fla., 10,000	11	2	5	..	..	..	..	..	..	..	14.3

* 3 weeks; † 2 weeks; § 1 week; ‡ Month of February.

MORTALITY STATISTICS ABROAD.

TWO WEEKS, ENDING FEBRUARY 16, 1884.	Total Deaths.	Deaths under 1 year.	Bronchitis and Pneumonia.	Diphtheria and Croup.	Scarlatina.	Measles.	Whooping Cough.	Typhoid and Typhus Fevers.	Small-pox.	Diarrhœal Diseases.	Annual rate per 1,000.
London, 4,019,361	3027	703	581	72	56	54	161	43	6	35	19.6
Liverpool. 573,202	530	116	..	3	11	11	19	10	4	7	24.1
Glasgow, 517,941	517	121	126	14	16	5	27	8	..	11	25.4
Birmingham, 421,258	302	69	..	4	10	6	5	1	12	7	18.7
*Dublin, 351,014	207	47	46	1	4	..	2	2	..	2	30.7
Manchester, 338,296	329	66	..	1	11	13	10	1	1	8	25.3
Leeds, 327,324	245	53	..	3	31	5	..	3	..	3	19.5
Sheffield, 300,563	252	67	..	..	16	3	7	4	..	2	21.9
Edinburgh, 246,703	191	32	37	4	6	10	9	4	..	4	20.1
*Belfast, 216,622	115	15	25	..	4	..	3	1	..	6	27.6
Bristol, 215,457	153	41	..	..	..	1	4	..	..	2	18.5
Bradford, 209,564	160	28	..	1	1	..	2	2	..	1	19.9
Hull, 181,225	138	45	..	5	1	..	2	1	..	1	19.8
New Castle, 151,325	137	29	..	1	8	2	6	4	..	1	23.6
*Havre, 105,867	44	12	7	1	..	..	..	..	..	4	21.6
Reims, 93,823	101	26	13	3	..	11	..	3	..	11	27.9
Nancy, 74,954	81	12	14	1	..	2	..	1	..	2	28.1
Breslau, 290,000	310	107	27	15	2	9	1	2	..	13	27.9
Brussels, 171,293	178	38	33	3	..	..	1	4	2	13	27.0
Cologne, 150,513	134	38	5	..	..	..	4	1	..	1	23.1
Christiana, 122,000	113	40	31	3	12	..	..	..	..	4	24.0
TWO WEEKS, ENDING Feb. 9, 1884.											
Frankfort, 145,100	89	21	9	3	1	..	1	2	..	5	15.9
Hanover, 131,200	103	23	2	6	3	2	..	1	..	..	20.3
Bremen, 119,561	99	35	15	2	1	..	1	..	..	4	21.6
Dantzic, 116,162	123	41	12	5	4	..	..	2	1	7	27.6
Stuttgart, 109,937	83	23	8	6	..	..	3	1	..	1	19.6
Strassburg, 110,739	101	41	21	3	1	1	2	..	..	13	23.3
Dusseldorf. 105,287	92	32	11	2	1	..	..	1	..	7	22.7
Nuremberg, 105,176	108	16	21	5	3	..	1	2	..	14	26.7
Chemnitz, 102,713	136	55	2	10	1	..	..	3	..	..	34.4
Madgeburg, 105,000	96	39	6	4	2	2	1	1	..	1	28.8
Elberfeld, 101,000	72	11	9	6	3	..	..	1	..	2	18.5
Barmen, 100,000	69	18	8	2	2	..	2	..	..	5	17.9
Altona, 97,000	95	26	11	3	2	1	4	1	..	8	25.4
Aix-la-Chapelle, 89,116	78	23	12	3	..	1	2	1	..	2	27.7
Mayence, 64,120	53	12	6	2	..	..	..	1	..	1	21.5
Amsterdam, 350,202	376	..	..	53	5	8	3	..	..	..	27.9
Rotterdam, 166,001	192	..	..	8	6	..	3	3	..	2	29.1
The Hague, 131,417	109	..	..	4	..	..	1	..	..	1	21.5
Lyons, 376,613	384	..	101	7	..	..	2	2	23	10	26.6
Berlin, 1,225,065	1042	302	44	133	16	6	13	4	..	35	22.1
Hamburg, 486,678	440	114	38	17	5	7	8	7	..	22	23.5
Dresden, 236,000	253	69	18	32	7	..	6	3	..	6	27.8
Munich, 240,000	272	84	20	9	4	10	6	3	..	19	29.4
Leipsic, 164,636	153	56	11	20	..	4	5	2	..	5	24.1
Kœnigsberg, 154,000	184	62	13	13	7	..	1	2	..	16	31.5
St. Petersburg, 928,016	1392	467	113	44	31	40	7	58	3	243	39.0
Bucharest, 200,000	238	76	30	14	6	5	1	8	..	24	28.7
†Paris, 2,239,928	2152	309	219	103	9	51	17	36	3	138	25.0

* Week ending Feb. 16; † 2 weeks ending Feb. 14.

VITAL STATISTICS OF IMMIGRATION.

NAMES OF STEAMERS, DATE OF ARRIVAL, PORT OF DEPARTURE, NUMBER OF PASSENGERS, NUMBER OF DEATHS AND BIRTHS DURING THE VOYAGE FROM EUROPEAN PORTS TO NEW YORK, FOR THE MONTH ENDING FEBRUARY 29, 1884.

	Vessels.	*From*	*Passengers.*	*Deaths.*	*Births.*
Feb. 5,	India,	Hamburgh,	266		1
" 6,	Gallia,	Liverpool,	291	2	2
" 8,	Schiedam,	Rotterdam,	107		1
" 8,	Rhaetia,	Hamburgh,	278		1
" 14,	Lydian Monarch,	London,	69		1
" 19,	Vreland,	Hamburgh,	437	1	1
" 23,	Cephalonia,	Liverpool,	192	1	
" 24,	America,	Bremen,	235	2	
" 25,	Egyptian Monarch,	London,	79		1
" 27,	Edam,	Amsterdam,	182	1	1
" 28,	Assyrian Monarch,	London,	111		1
" 28,	France,	Havre,	429	1	
" 28,	Hohenstaufen,	Bremen,	532	4	1
" 28,	Castalia,	Gibraltar,	65	1	
" 29,	Bohemia,	Hamburgh,	893		2
			3,166	13	13

STATISTICS OF SUICIDE is the title of a very remarkable and interesting statement by Dr. Pellier, reviewed in "*Lyon Médical.*"

In France, previous to 1845, the number of suicides by drowning was far greater than those by hanging; since that time hanging has become more popular. Throughout Europe hanging is evidently on the increase; this is specially true of Russia, of Transylvania and Gallicia. It has generally been asserted that one-third of all the suicides in Sweden are effected by means of poison, but M. Legoyt says that poisoning is no longer on the increase, but hanging is becoming much more frequent.

Suicides by drowning have generally been more frequent during the warm months of summer; hanging and poisoning are preferred during the cold months of winter and spring.

Taking the period from 1872 to 1878 the total number of suicides in France by months, is 7.58 per cent. in January; 6.65 in February; 6.48 in March; 9.73 in April; 10.34 in May; 10.99 in June; 10.35 in July; 8.63 in August; 7.43 in September; 7.41 in October; 6.52 in November, and 5.92 in December. In Paris, however, the seasons seem to have very little influence, according to statistics taken from 1857 to 1859 inclusive.

In France full grown men generally hang themselves, young men shoot themselves in the head, and old men hang themselves. Women generally drown themselves, and this is true not only of France, but of all Europe, with, perhaps, the single exception of Russia.

ADULTERATED WINES.—Eastern observers and experts declare that the consular reports of wine adulteration exposures in Europe are alarming our dealers. It is a fact that nearly all cheap wines are falsified or blended, and where the mixing fails of effect, spirit is added to give piquancy and strength. The great mass of imported claret, says one authority, is the result of wine sent from Spain, Portugal, and Italy to France, to be made into claret. It is bad enough to have them doctored when they arrive, but it is now shown that they are adulterated in the original cellars before being shipped to France. All these proofs give additional force to the argument in favor of home products. So long as wine is to be used, the logic of facts establishes the wisdom of favoring the home article, over which we may put police regulations to prevent adulteration. It is no longer necessary to enter upon the examination of proofs as to the genuineness of most foreign wines, since the country is convinced that the larger proportion sent to us are false in more respects than one.

INTEMPERANCE.—Dr. T. D. Crotters, Hartford, Conn., Secretary of Committee of American Association for the Cure of Inebriates, has issued an interesting circular of inquiry into:—

The heredity of inebriety—particularly as to the presence of insanity, epilepsy, phthisis, or neurosis in the parents or relatives of the inebriate; inebriates who have been so made by head injuries of any kind, sunstroke, syphilis or other diseases, or by overwork, anæmia or any specific cause; any cases in which insanity or epilepsy was either preceded or followed by inebriety—and if so whether traceable to alcohol or to some inherited or acquired habit; any mental and physical changes concerning the general health of the inebriate suggestive of the need of physical care and treatment.—The questions are suggestive, and are likely to lead to much practical information.

THE NEW SURGEON-GENERAL OF THE NAVY.—Though many will regret that Medical Director P. S. Wales was not

reappointed in recognition of the excellence of his service in the promotion of sanitary and other scientific work to a degree greatly in advance of any of his predecessors, all who know Medical Director F. M. Gunnell, his successor, the senior medical officer on the active service list, and therefore entitled to the position by rank, will concede his eminent fitness for the position. His reputation in the corps is second to none, and there is abundant reason to suppose that the excellent measures inaugurated by Dr. Wales will receive the encouragement and support which they merit. Dr. Gunnell is a native of Washington, and an alumnus of Georgetown University, Washington. He entered the service thirty-five years ago and has spent about half of the period at sea—the largest amount of Sea Service any member now on the active list.

NEW YORK.—Dr. Alfred L. Carroll, of New Brighton, Staten Island, has been elected Secretary of the New York State Board of Health, to fill the vacancy created by the death of Dr. Harris.

BALTIMORE.—Dr. James A. Steuart has again been appointed Commissioner of Health—for which the city may well be congratulated. Dr. Jas. F. McShane has been reappointed Assistant Commissioner.

LITERARY NOTICES.

ILLUSTRATIONS OF THE INFLUENCE OF THE MIND UPON THE BODY IN HEALTH AND DISEASE, DESIGNED TO ELUCIDATE THE ACTION OF THE IMAGINATION. By Daniel Hack Tuke, M.D., F.R.C.P., LL.D., late President of the Medico-Psychological Association, joint author of the "Manual of Psychological Medicine," and co-editor of the "Journal of Mental Science." Second American from the second English edition. 8vo., pp. 500, with two plates illustrating nerve centres and the paths of nerve impulses. Philadelphia: Henry C. Lea's Son & Co.

To the large body of readers interested in the study of psychical phenomena, this work is of special interest. The subject is treated from a strictly physiological standpoint—the only foundation upon which substantial knowledge of the influence of the mind upon the body can be based; and as thus studied,

the intelligent reader will not fail to acquire that knowledge which will enable him to distinguish between conditions which are real and often neglected, on the one hand, and those which are fraudulent, and often accepted as real, on the other. The author well says: "There is such a thing as a scientific snob. He it is who is quite certain that he has fathomed the depth of the great ocean of knowledge, and that he can gauge the spheres with the measure which he carries in his own pocket." In no department of science is the scientific snob more frequently found than in that on which this book sheds light. The author shows that what cannot be supported by physical laws and demonstrated by rigid tests in this, as in other fields of actual knowledge and scientific research, is unworthy of credence. To physicians, especially, we heartily commend this work as the best on the subject of which it treats—it is necessary to all who would distinguish many otherwise obscure morbid phenomena from mere emotion or fancied diseases. To clergymen it is scarcely less necessary than to physicians, as they too, by the circumstances of their profession, are often brought in contact with persons laboring under real or imaginary mental disturbances, where the power of discrimination is of inestimable importance. And to all who would be able to distinguish between real psychological phenomena and imposture, this work is a treasury of knowledge.

LEGAL MEDICINE. By Charles Meymott Tidy, M.B., F.C.S., Master of Surgery, Professor of Chemistry and Forensic Medicine at the London Hospital; Official Analyst to the Home Office; Medical Officer of Health for Islington; Late Deputy Medical Officer of Health and Public Analyst for the City of London, etc., etc. Volume III. Legitimacy and Paternity, Pregnancy, Abortion, Indecent Exposure, Sodomy, Bestiality, Live birth, Infanticide, Asphyxia, Drowning, Hanging, Strangulation, Suffocation. 8vo., pp. 343. New York: William Wood & Co.

This, the January volume, 1884, of "Wood's Library of Standard Medical Authors," is the result of the author's most recent studies and conclusions, prepared from his Lectures on Legal Medicine, delivered at the London Hospital during the summer session of 1882. As in the previous volumes, cases illustrative of the principles discussed are appended to the several

chapters—reference being made to them by notes in the text. This work has been so long an accepted standard by the profession, it is only necessary to add that it comprehends the most recent, as well as the best proven advances in legal medicine.

COOKED CHEESE.—In the excellent series of articles on the Chemistry of Cookery, by W. Mattieu Williams, in process of publication in the *Popular Science Monthly*, in the number for March is an excellent chapter on the cooking of cheese, and the following among other receipts.

From Gouffe's "Royal Cookery Book:" Put two and one-fourth ounces of flour in a stewpan, with one and a half pints of milk; season with salt and pepper, stew over the fire till boiling, and should there be any lumps, strain the *soufflé* paste through a tammy-cloth; add seven ounces of grated Parmesan cheese, and seven yolks of eggs; whip the whites till they are firm, and add them to the mixture; fill some paper cases with it, and bake in the oven for fifteen minutes.

Cre-Fydd says: Grate six ounces of rich cheese (Parmesan is the best); put it into an enameled saucepan, with a teaspoonful of flour or mustard, a salt spoonful of white pepper, a grain of cayenne, the sixth part of a nutmeg, grated, two ounces of butter, two tablespoonfuls of baked flour, and a gill of milk; stir it over a slow fire till it becomes like smooth, thick cream, (but it must not boil); add the well-beaten yolks of six eggs, beat for ten minutes, then add the whites of the eggs beaten to a stiff froth; put the mixture into a tin or card-board mould, and bake in a quick oven for twenty minutes. Serve immediately.

Here is a true cookery of cheese by solution, and the result is an excellent dish. But there is some unnecessary complication and kitchen pedantry involved. The following is Mr. Williams' own simplified recipe:

Take one-fourth pound of grated cheese, add to it a gill of milk, in which is dissolved as much powdered *bicarbonate of potash* as will stand upon a threepenny piece; mustard, pepper, etc., as prescribed above by Cre-Fydd.* Heat this care-

*If the mustard is pure, only half as much. Cre-Fydd's directions, like those common to cookery books before the Adulteration Acts were passed, refer to mustard mixed with about an equal quantity of wheaten flour. Therefore, in following any recipe of old cookery books for its use, only about half the quantity should be used.

fully until the cheese is completely dissolved. Then beat up three eggs, yolk and white together, and add them to this solution of cheese, stirring the while. Now take a shallow earthen-ware dish or tray, that will bear heating, put a litte butter on this, and heat the butter till it frizzles. Then pour the mixture into the dish, and bake or fry it until it is nearly solidified.

A cheaper dish may be made by increasing the proportion of cheese—say six to eight ounces to three eggs, or only one egg to a quarter pound of cheese for a hard-working man with powerful digestion.

Salts of potash are necessary constituents of human food. They exist in all kinds of wholesome vegetables and fruits, and in the juices of *fresh* meat, but *they are wanting in cheese*, having, on account of their great solubility, been left behind in the whey. They are added to the cheese in cookery, to make up for this deficiency.

ILLUMINATING GAS AND ITS DANGERS.—Health Commissioner Raymond, of Brooklyn, has done the public an excellent service by his researches in regard to the qualities and dangers of illuminating gas. His report—a pamphlet of over four hundred pages—contains the results of an extensive correspondence, presenting the number of deaths from the inhalation of illuminating gas, and the conditions under which they occurred; modes of manufacture of illuminating gases, method of purification, analysis, relation to health, relative danger of different kinds and qualities, and much other useful and practical information to all health authorities, municipal bodies and gas manufacturers.

"PALLISER'S USEFUL DETAILS," consist of a series of architectural drawings and designs well calculated to promote the improvement of domestic architecture in all of its departments; of special value to all architects and builders who would cultivate a taste for improving the beauty and comfort of houses and other structures. The "Details" are mounted as maps, for ready reference in a compact form; or for separation and distribution on the walls of the architect's office—tasteful, picturesque and useful.

Palliser, Palliser & Co., Bridgeport, Conn.

THE PATHOLOGY AND TREATMENT OF GONORRHŒA.—By J. L. Milton, Senior Surgeon to St. John's Hospital for Diseases

of the Skin, London. Fifth edition, 8vo, pp. 314. February volume of "Wood's Library of Standard Medical Authors." New York: William Wood & Co.

This volume is an abridgment of earlier editions of the same work, but thereby rendered the more valuable as a hand-book of the medical practitioners, as it contains everything essential in the diagnosis, pathology and treatment. It is a recognized standard authority, and gotten up in the same excellent style as the preceding volumes of the same series.

ONE THOUSAND AND ONE RIDDLES contains the material for much fun and home amusement in the way of riddles, conundrums, enigmas, and hints for acting charades. If parents desire to have their children amused, and also amuse themselves, they cannot do better than to send for this book. It contains 128 pages, with enameled paper cover, and will be sent by mail, post-paid, to any address, upon receipt of 15 cents, by J. S. OGILVIE & Co., Publishers, 31 Rose Street, New York.

FOOD AND DRINK FOR INVALIDS.—Dr. A. W. Nicholson, Lansing, Mich., has formulated a very useful and convenient *Leaflet* for physicians in active practice, designed to facilitate the giving of instructions to nurses in regard to the selection and preparation of food and drink for patients. It comprehends an excellent category, from which a selection may be designated with facility, and plain directions for preparations, by which any intelligent nurse can carry out the directions to the letter. Price, one dollar per 100. A sample copy will be sent to any one on application. Address the author.

HARPER'S MAGAZINE for April contains two papers of special interest to all sanitarians—*Modern Sanitary Engineering*, by Prof. W. P. Trowbridge, and *Workingmen's Homes*, by R. R. Bowker. The sketch of Octavia Hill and her work, in this paper, is especially worthy of the attention of all persons interested in tenement house reform, showing, as it does, the contagiousness of social elevation by contact with the people —in which Octavia Hill's strength lies. And until more of this spirit is shown in New York than has been hitherto, the vilest tenement house population in the world will continue to obtain.

THE TEXAS COURIER-RECORD OF MEDICINE, edited by Drs. F. E. Daniel and W. B. Brooks, is among the sprightliest of

new journals. Has many contributors on subjects of practical mportance to all physicians, and an editorial summary which displays much research and apt judgment. Monthly, 72 pages text. $2 per annum. Fort Worth, Texas.

"THE OLD OAKEN BUCKET" AGAIN.—In the concluding words of our notice of this, in February number, that "THE SANITARIAN was deceived," we had no intention whatever of implying intentional deception on the part of the author of the parody, or of any one else. All we meant was: We were deceived in *our inference* by the manner in which the copy was presented to us and regret that the abruptness of our notice should afford any suggestion whatever to the contrary.

PUBLICATIONS RECEIVED.

Annual Report of Health Department of Baltimore; Biennial Report of Minnesota State Board of Health, for 1881–1882; Annual Report of Health Officer of Burlington, Vt., 1883; Annual Report of German Hospital, New York; Recent Progress in Diseases of the Nervous System—Talbot Jones, M.D.; Biennial Report of State Board of Health of Maryland, 1883; Annual Report New York Physicians' Mutual Aid Association; Manhattan Eye and Ear Hospital Report, New York, 1883; Lecture on Ankle Joint Disease—N. M. Shaffer, M.D.; Minutes of N. Y. State Medical Association; Medical Symbolism —T. S. Sozinsky, M.D.; Note on Fæces of Starch-fed Infants —N. A. Randolph, M.D.; Leprosy in Minnesota, 1869–1883— Ch. Grönvold, M.D.; Tribute to James Marion Sims, M.D., LL.D—W. O. Baldwin, M.D; Annual Report of State Board of Health of N. J., 1883; Report of Secretary of State Board of Health of W. Va., 1881–1883; "Our Gallery"—Nathan Allen, M.D., LL.D.—New England Medical Monthly; Circulars of Information: Recent School Law Decisions, Education In Italy and Greece, Buffalini Prize—Bureau of Education; Naso-Pharyngeal Fibromata—R. L. Lncoln, M.D.; Prevention and Treatment of Puerperal Fever, two pamphlets—T. Gaillard Thomas, M.D.

"A BILL TO PROTECT THE PUBLIC HEALTH."

March 3, 1884, Mr. Pettibone introduced into the House of Representatives the following *Bill*, which was read twice, referred to the Select Committee on the Public Health and ordered printed:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Surgeon-General of the Army of the United States, the Surgeon-General of the United States Navy, and the Supervising Surgeon-General of the Marine Hospital Service shall hereafter constitute the United States Board of Health. Such Board shall have full power to make such regulations as may be necessary for the government of the quarantine service of the United States and the protection of the public health; and all the power and authority now provided by law for the control, management and regulation of the public health of the United States shall be, and the same are hereby, vested in said United States Board of Health.

SEC. 2. That all consular officers in the service of the United States shall hereafter, at such time and under such regulations as the Secretary of State may from time to time provide, make report to the Secretary of State of all matters affecting the public health, which said report shall, when received, be transmitted to the said United States Board of Health.

SEC. 3. That such sanitary investigations as may from time to time be necessary shall be conducted, under the direction of the said Surgeon-General of the Navy, at the Museum of Hygiene of the Navy Department, and full report thereof made to the said United States Board of Health.

SEC. 4. That the United States quarantine service shall hereafter be conducted and managed by the said Supervising Surgeon-General of the Marine Hospital Service, acting under the direction of the Secretary of the Treasury.

SEC. 5. That the said United States Board of Health shall cause to be prepared and submitted to the Secretary of the Treasury annually a statement of all the transactions of said Board for the preceding year, together with a full and detailed account of all moneys expended by them, who shall report the same to Congress.

SEC. 6. That chapter two hundred and two, volume twenty, of the United States Statutes at Large, approved March third, eighteen hundred and seventy-nine, and chapter sixty, volume twenty-one, of the United States Statutes at Large, approved July first, eighteen hundred and seventy-nine, and all acts and parts of acts inconsistent with the provisions of this act are hereby repealed.

THE SANITARIAN.

MAY, 1884.

NUMBER 174.

A PERVERTED WILL AS A FACTOR IN INSANITY.*

Among our social science organizations, humanitarian societies, relief boards, medical associations, and the Church, there is no more pressing study to-day than that of the causes and prevention of disease. Disease, vice, crime, are singularly associated. Heretofore much strength has been applied—perhaps it is not too strong a statement to say that nearly all efforts by the humane have been made—to relieve evil after it has afflicted humanity; seeking to save that which is lost, or nearly lost, and without endeavoring to prevent, to foresee, to forewarn, and to preoccupy, that the evil may not come. But he who lives in and for to-day must not be satisfied to alleviate the evil that is upon us, he must go to the hidden source and stop the evil before it is born, before it begins to work. The wide-awake physician must not only be able to prescribe for and treat fever and small-pox in the best way, but he must destroy the germs of fever and the virus of the scourge.

While insanity is not a modern disease, its great increase and its peculiar forms of late force themselves upon us almost with the phase of a new calamity, and when we consider its close affiliation with the numerous diseases of brain, nerves and kid-

* Recast of a Lecture in the Department of Physical Education and Hygiene, given in Amherst College, Mass., Dec., 1883, by Prof. E. HITCHCOCK.

neys, it is almost appalling. This increase naturally leads the student of mind and body to ask the question, "why?" Why does it come upon us with such force now, in this advanced civilization, with a more intelligent idea of how to properly live, with a better idea of how to prevent many diseases, and overcome many injurious tendencies, with more intelligence, scientific knowledge, a better morality, more religious teaching, and the means to provide more abundantly for the necessaries and comforts of life? Why are not only the degraded and vicious, but the pure, upright and sound, weighted down in this way, so that we hardly can find a family in civilized Europe or America which has not some of its money, if not its heart-strings and blood, in an insane asylum?

And this question is not only put as to why insanity increases, but it is equally pertinent, why does it come at all? If we call this condition of the mind a disease—which it seems to be—then we can say it is the result of some broken law of our nature. That we can demonstrate it to be a broken law of the mind seems hardly satisfactory, since no one can tell us as yet what the mind is, or how we can bring on a disease of the mind alone, because we don't know how the mind acts outside, or without the influence of the body. But we have abundant evidence that the disease or condition of insanity can be brought about by diseases of certain parts of the body, and could we isolate the mind from the body as perfectly, or imperfectly, as in many instances the body has acted independently of the mind, we might, perhaps, say that the mind could be diseased, and we should be able to learn how to write a prescription for an aberrant intellect. But till we have more extended knowledge than we now possess, we must surely say that the insane state depends primarily or secondarily upon the bodily condition. And even if a mental or moral state induce insanity, it must always find such a physical condition that the mental activities will be insane, otherwise why do not the same peculiarities and emotions always produce insanity, which is not the case.

If we try to explain the apparent causes of insanity, it will probably be the easiest method to state what are *not* causes of insanity; take fewer words and figures to answer the affirmative by stating the negative. Or if we are called upon to cull

out the insane from the sane, we should hardly fail to come out aright if we adopted the sweeping answer as given by a distinguished expert in lunacy before a commission of the English Parliament: "Gentlemen, there is but one sane mind in the universe!" And, without doubt, the bewildered expert in insanity would often paraphrase the sentiment of the Psalmist, and instead of the utterance "I said in my haste all men are liars," would be glad to say all men are insane; and instead of starting with mental soundness as a *point d'appui*, establish his base at the utter absence of mind as in the lowest idiot, and run the grade up and on to the most appreciable soundness and integrity.

Whenever we read the tables of causes of insanity in the reports of Lunacy Commissioners or Superintendents of insane hospitals, we are appalled not only at the number of inmates, but also at the number of causes which induce insanity. Religious influences too weak or too strong—moral impressions, emotional energies, will, much or little æstheticism, debauchery, licentiousness, irresolution, and many others, may be found under the mental and moral causes; while the physical or bodily causes are almost covered by the sweeping assertion that every disease, and almost every bodily accident, injury, or sometimes disorder, can plainly be said to be the cause of the insane condition. And yet precisely the same causes or conditions of body or mind, with equal intensity and under precisely the same conditions so far as the acutest observation can ascertain, may affect two persons as nearly alike as it seems possible to have them, even members of the same family; so that one of them becomes a raving maniac, while the other possesses undisturbed reason, judgment, calmness, and integrity.

So that if we accept insanity as a disease and believe in causes of it as in other diseases, we find them everywhere and in everybody. It not only occupies the rich, the cultivated, the educated, the favored, the pure, the benefactors, the self-denying and the religious; but it is as surely and abundantly a guest of the poor, the uncouth, the ignorant, the unlucky, the filthy, the stingy, the avaricious and the God-forsaken generally. And though the psychological expert would class all mankind as well and ill-favored, and give a greater weight

of numbers to one or the other, if possible, yet he fails to give us any such result. Surely then, we may say with safety, that what we call insanity is not a disease, in the common acceptation of the word; is not a disorder, not a something which has one or more specific causes, or is the result of ordinary laws broken, and has a remedy that we apply like other diseases and become whole again.

Suppose, then, we do not call insanity a disease, as we talk of typhoid fever or pneumonia, but that we consider it as we do near-sight, or the far-sight that comes with age; or as we have gray hair, a light complexion, are better or more scantily furnished with fat, or any of our marked features, mental or bodily. Why may we not rather call it a *condition of our being* as much as evil and suffering in general are conditions of human life, or even as death itself? It is not, to be sure, as fixed a condition as death; but is it not one of the limited conditions of life, so long as we are ignorant of and disobedient to so many of the laws of body and mind? If the insane condition is everywhere, and yet we know may sometimes be palliated or even removed by influences and means which promote a greater harmony between the action of mind and body or even a more correct manner of bodily life, may we not so labor to live or so live and labor that some of the limits of this condition can be removed or restrained, and both body and spirit be more free and with a larger fruition?

Among uncivilized peoples, and among the earlier nations of the world, we have reason to believe there is and has been comparatively little insanity. It is a condition which seems not to originate or flourish in a simple state of society, or where people live according to nature, or with uncultured habits and customs. It seems to be like fruit of the vegetable world: so long as it is wild and but little developed in richness it is simple and without much juice or pulp; but when it becomes cultivated by artificial care, pruning, protection and food, and is full of richness and flavor, then it is infested and injured by parasites and other forms of innumerable animal and vegetable life. So long as man lives in the habits of simple animal nature, so long does he keep this insane condition in its lowest place and power. But when he rises above the common sense gratifications, when his aspirations for something refined and

higher take possession of him, then come in a multitude of influences which tend to disturb and destroy this higher part of his being, and man with all his knowledge has not as yet found the power to control this insane condition. Civilization, culture, morality, religion and refinement are not incompatible with our highest and most complete state of being hereafter, but as high cultivation in the vegetable world requires more labor, and brings in weeds, worms and adverse agents which are unknown to plants in nature, so does culture of man's higher powers bring in its host of enemies in the form of inordinate self-will, excess, epilepsy, apoplexy and the infinite variety of nervous diseases. As steam, electricity and printing have revolutionized most of the old methods of commerce, trade and mechanic arts, so have intellectual and spiritual progress unbalanced much of man's physical and mental state, and we now grope about for some clue to lead us out of this darkness.

The Creator has endowed us with passions, powers and possibilities over which we have control. We may gratify our appetites, or indulge our passions to the extent of a reasonable pleasure, so that we may desire again their proper indulgence, or we may so saturate ourselves that indulgence is repulsive; we may reasonably use our powers, or say with another, "Now comes the dark hour his surfeit has made."

There are none of our powers but we may use to our satiety, disgust and revulsion, be they the tissue of coarse muscle or the rods and cones of the delicate retina. With our physical actions nature has given a sense of weariness, an instinct which says enough, before this disgust and danger appears. But our minds are of such make and capabilities, that overwork and excessive expenditures of nerve force may be almost indefinitely carried on by an indomitable or uneducated or uncontrolled will. The beast, with no wish for more than food and external comfort, ceases nervous expenditure when creature comforts are satisfied; the man with a feverish desire for wealth, a love of knowledge, a yearning for the immortal and infinite, with his physical powers in subjection to the spiritual, makes a slave of the physical part; over-works, exhausts the brain and nerves, and thus he is found by those about him to have lost himself and given the insane condition the supreme sway over him.

The so-called vegetative functions of the body, such as digestion, breathing, circulation and most of the secretions, are maintained automatically by a power within us, independently of the will. It is, however, equally true that the will has a modifying power over these functions, stimulating or "inhibiting" (controlling) them. To all these functions there is a natural rate or limit of power, which, if undisturbed—not impeded or accelerated—will carry on the life to its full number of days. But if any other influences are made to bear upon these functions, be they those of stimulation, repression or inheritance, some great change must of necessity be produced in the body. Of course the first and most expected is that of local or constitutional disease. And we may reasonably infer that where man begins life with a good inheritance, a period of existence under 70 years indicates that the automatic or will processes have been interfered with. In other words, the *proper control* of bodily and mental functions may be considered as a prime factor in our lives. If a watch or machine lies frequently idle, it is soon out of order and fails to go. And if excessive speed be put to an engine, a carriage, or a ship, we soon learn that "it is the pace which kills." Every power of body and mind has its speed, its amount of work to do; if this be interfered with, then disorder must be the result. The discoveries of medical and sanitary science make very plain many causes of the grosser bodily diseases, and preventives and remedies are well known and applied. But for the diseases of our important intricate and delicate nerve centres and branches, we have but few remedies and preventives. The mysterious union of mind and matter: remarkable exceptions of the power of mind over body, and kindred matters, show us that there is a vast world in which we are to travel to discover the geography, and the people who dwell in it.

The organs of our bodies are supplied with what we call vital force through the brain and nerves. This is the power which gives *activity* to them; or we know it as the stimulus of vital actions, the most of which depends on the will for immediate guidance. But there are equally important sources of power within us which are known as *inhibitory*, or those controlling and checking the undue activity of organs. Were it not for this, for aught we know activity would go on to the destruc-

tion of the organ and the whole body; just as a stationary engine needs a governor to check the supply of steam when the stroke is too rapid. And as in the machine, so in the body, this control, this checking of power, is as important to the integrity of both, as is the source of power or the means to increase speed. An organism or machine needs a *control* of its power as much as an *excitement* of the power. And for the organic processes of the body—those not immediately under the control of the will—nature has provided the inhibitory centres in the brain, which are to us as the automatic regulation of the furnace fire, the governor of the steam engine, or the compensation pendulum of the clock.

These, however, are mainly for those processes which are not directly dependent on the will, such as breathing, motion of the intestines and heart, and the processes of growth and nutrition. But the action of the muscles and all of the intellectual processes, have no such inhibitory power over them; they are the ready servants of the will; the body with its powers, and the mind with all its activities is almost entirely under the will; the will is (or should be) the master, and as the will wills, so must the mind and body be.

When a spirited but well-trained horse breaks loose from the stable or harness, he is in great danger of injuring or even destroying himself, because he has not the control of his master. There is no control of his powers by himself or his master, and his activity soon injures or ruins him. As men and women arrive at full possession of their powers and possibilities, with unlimited freedom to use them, it is too frequently the case that they are not able to exercise over them proper control, and so rush on to their destruction like a runaway horse. In a despotic government, among a people stupid and ignorant, with those who have no aspiration further than to say, "Let us eat and drink, for to-morrow we die," we not only find but little insanity, but we can assign the cause—there is but little mind to develop or be lost, and the wants are so simple and purely animal, that the functions are attended to in an automatic way, and mere existence passes on in the normal manner. But as soon as ideas come into the mind, and better physical conditions may be obtained, relief from excessive heat and cold, more palatable and nutritious food, more agreeable

sensations secured, and, above all, when the soul sees its possibilities and has longings for what is pure, elevating and infinite, then man becomes insatiate, and puts forth his utmost energies to secure what he so longs for, and feels that he will have. Then is the time when he lives and labors beyond his powers; then is the time when he puts his reason and judgment under his feet, and allows his impulses, his taste, his feelings, and too often his caprices, his appetite and his sensual nature to have the mastery of him; then he sets aside self-control; then he permits his sensitive nature, and not his reason, to guide him, when, as a consequence, reason is overpowered, and he finds himself in a condition known as insanity. He has then lost, or has allowed to be lost, his self-control. It is not the higher nature of the man that now governs, but the control of self is gone; not as yet the man destroyed, but the power that governs him is set aside, and instead of the will, the disturbed mind and the associated disordered body have gained possession, and are reigning in riot and disorder.

Without doubt, a prominent cause of American insanity is the peculiar and stimulating climate, the dryness of the air, the immensely developing possibilities of the material wealth, and fast living generally. But the same causes cannot be attributed to the increase of insanity in staid Scotland and sober Germany, where the insane rate is on the increase, nor in autocratic Russia. But steam and electricity are moving and lifting the world. They are not only developing wealth, creature comfort and luxury, but they are *disseminating ideas*, and ideas are what move the world; they are showing all grades of people that there are possibilities of bettering the material and spiritual condition; that intellectual knowledge is an immense help to better things; that to think for themselves, and to acquire the thoughts and ideas of others, give an immense advantage; and to acquire this power to lift the load of ignorance is what suffering mankind is putting forth now its intensest energies to accomplish. The degraded Russian has breathed a sniff of free air; he is bound to breathe it fully; he learns that there may be better living and more liberty to enjoy his own; he feels that some one is holding him down in slavery and ignorance. This leads him to contrive how he may get out from under this load; he is restless, un-

happy, uneasy; he is ready to fight those who seem to oppose him; his bodily functions are disturbed, he doos not eat and sleep like an animal; these ideas disturb him, and the mind, awakened and aroused and confused, reacts upon the healthy bodily functions, and he is unsettled, has no longer self-control, but is led about by mental disorder, disturbance, and perhaps disease.

These free thoughts, these democratic ideas make unhappy, unsettled and inharmonious not only the Russian, but many other individuals and people, who learn that they may be more free, and have rights and privileges bestowed on them by God, but which their rulers are depriving them of. This continual chafing, uneasiness and unsettled condition overcoming a patient self-control, may safely be set down as one reason why we are finding so much insanity among the nations.

But this lack of self-control or unsettledness is manifested in other ways. Many who are not disturbed by ideas of equal rights of government are impressed by possibilities of bettering their condition. Everybody enjoys luxury and refinement—in different ways and methods, it is true; but railroads and steamships cause people to circulate more and more, and these everywhere bring people in contact with better modes, conveniences and comforts of life, and lead them to want better things, so that they are unsettled, not satisfied with present surroundings; their labor is disturbed by cravings, and that generally unsettled condition which is not only unhealthful in the ordinary care of the body, but the nervous centres are worried, and put to an unequal strain, and they lose that ease and self-control which is so essential to serenity and security. The perplexities, the feeling of debasement, and of an unrighteous inequality of life and its surroundings, destroy the healthy equilibrium, and, ere the man is aware of it, the mind is thrown from its balance.

Self-control is weakened, specially in our American public, by a disregard or disesteem of law and authority. The democratic idea, the intense individualism that permeates the body politic as does our blood the body, is a demoralizer to a sound mental condition. The disrepect for civil law, as manifested by many who only seem to see in it red tape and needless formality, is a good seed of insanity. The feeling that the

letter of the law is not what it should be, soon leads to a disregard of the spirit of the law, and then with private interpretation of it, license and unbroken law readily supervene. The mind, to be sound, must be governed by laws, and anything which tends to weaken the outside workings of law by a most powerful reflex influence reacts in a deadly manner upon the mind itself; leads to the control of the mind by something outside of self, and often what is insanity but a loss of self-control!

The disregard of law is seen not only in the broad sense of civil law, but in the child, and in the young child. A child in the arms of the nurse is almost insane often when not under the control of the mother or nurse. The crying, the struggling and the working of a stubborn will are but the seeds of insanity commencing to germinate. And the boy not restrained properly in his food, his play, or many of his whims, manifests a further development of the plant of insanity. And the youth who will not be controlled in the use of tobacco or alcohol has but a form of insanity, beginning, it is true, but too soon passed beyond the stage of arrest where he will be unable to check his appetite for narcotics and stimulants—and who is more insane than he or she who cannot control their appetites? And when the man of business loses such control of himself that to make money he will sacrifice sleep, proper rest, recreation, or other duties essential to health as a physical and a moral being, has he not lost his reason? Would not a proper self-control prevent these habits and thus perhaps preserve his sanity?

The possibilities of acquiring great and sudden fortunes of wealth destroy much self poise and control, and induce insanity. The neglect of simple laws of health, the excitement to the nervous and circulatory system, and the more intense disturbance of the mind at the chance of the loss or gain of a fortune in a moment, destroys that self-control which leads to the insane condition.

The speculative tendencies in science, theology and religion, and the questions of social and political economy, tend in many instances to destroy the harmony of function between different parts of our nature, unsettle and disturb the workings of the simple laws of our being, and thus bring on nervous and mental disaster. Everywhere we find that a disregard of law, order

and harmony tends only to ruin. Nature, it is true, is elastic, often compromising; is tender, patient and kind when the law is broken, but yet the penalty for nature's broken laws always follows sure at some time—not always in the way and with the direct punishment which we expect, but the balance is destroyed, and the compensation will be someway delivered. There are diseases which always follow specific violations of law. There are also certain violations of physical laws which incur one of many penalties—or the disease will be fastened on to the weakest or most vulnerable part of the man. Certain plants will grow best in certain soils, and certain diseases find their own gardens. Without doubt, a reason why so many diseases and excesses now tend towards nervous and mental disorder is both because modern life and science have fortified the system against many common diseases, or have shown how to subdue the power of them, and that with our refinements, our more intellectual and spiritual progress, our aspiration for and enjoyment of the æsthetic and spiritual life, we have not learned what is the proper limit of endurance and capacity of the mind; we are working the higher part of our natures at the expense of the lower. Whatever be our possibilities in time and eternity, while the soul is linked to and is a part of the body, the whole man is under limitations fixed and invariable, and who gets the largest knowledge and conception of these limitations, he it is who learns the self-control by which he may be more safely guided away from the rocky shores of mental and spiritual disorder as he goes on the voyage of life.

One of the oldest and wisest superintendents of hospitals was once asked to give a condensed statement of the causes of insanity. He replied: "I should put it all in the one word *excess*." It should not, however, be understood by this that it is always an over-amount of one or more activities or agents that bring on this condition, for oftentimes too little of some power or function makes people insane. There is an imperfect balancing of mental or bodily characteristics. A feeble ability to resist the lower appetites, or even an unwillingness to allow the higher and purer ones to be properly and moderately used, may be as sure a cause of insanity. The girl who has not strength of virtue enough to repel the advances of him who flatters for the basest purposes, possesses an excess of the weak-

est elements of character. And the glutton, the drunkard, the tobacco-user, shows that his power to resist appetite is overpowered by inordinate strength of the baser and weaker elements of his nature. He who suffers himself to be overworked or overdriven, who gives way to excessive emotion, who yields his judgment to his sensibilities, who will not hear to sound advice or wisdom, this excess of weakness may be his cause of insanity. This excess of weak, selfish gratification and indulgence, this disregard of any of nature's laws, most positively brings its penalty in due time—it may be to-day, it will be to-morrow.

> "The mills of the gods grind slowly,
> Yet they grind exceedingly small;
> Tho' with patience he stands waiting,
> With exactness grinds he all."

As in Bunyan's pilgrimage, all the fingers on the guide-posts pointed towards the city of destruction, so in the abuse of man's physical, mental and moral nature, everything points to insanity, and only the strong man will disregard the guide-posts and journey in the opposite direction.

Finally, my remarks would be incomplete without a warning against alcohol and tobacco. Not with the view of frightening people by telling them what poisons these substances are, or how much money they cost, or about the widows and orphans they are responsible for, or that all smokers and drinkers die young; nor will I here urge the signing a pledge to be a religious duty; but I do urge the truths of science and experience, that nothing deprives a person of their self-control, or plunges them into excess more readily, deceitfully and treacherously than alcohol and tobacco.

There is not infrequently a smoker of whom it is impossible to say, he is surely injuring himself by tobacco: he is tough, he is protected by extraordinary conditions, his constitution is such that he can endure what his neighbor cannot; he is, in short, a remarkable exception. So some men live who have drunk barrels of liquor, and are yet apparently well and strong. They, too, are remarkable exceptions. We cannot ignore these facts. Should we adopt such ultra views as to deny them, we should fail to persuade reasonable people of the real truth of the case.

But where we find one man who withstands the intoxicant and the narcotic, how many who began with him have gone down? We see and know and feel the men who live, move and act with us, but when they lie under a tombstone we soon forget them, and their influence seldom lasts long after they have "dust to dust and ashes to ashes" turned.

One need not be told that he is not strong, that he has not manhood enough to resist excessive gratification of appetites and passions; but he may have placed before him the testimony of science and experience, which shows that nervous maladies, weaknesses, abnormalities and insanity are most seriously on the increase, and that while the number of their causes is immense, none are so certain as unrestrained indulgence of the sensual appetites and passions.

MARINE HYGIENE: PROTECTION FROM SCURVY ON LONG, AND ESPECIALLY DURING ARCTIC VOYAGES.

In an article by the writer upon the Hygiene of the Naval and Merchant Marine, published in Buck's Hygiene, allusion was made to the use of potatoes preserved by the whalers in their long cruises, as observed some years ago in a cruise in the Pacific Ocean.

As they were inspected then, the potatoes were fresh, uncooked, had been peeled, cut into slices, placed in a hogshead and covered with dense black "sugar-house" molasses, such as is not found in the market at the present time. The potatoes were, when cut into, white in the interior, and only the superficies were of a dark brown color, to perhaps the extent of less than a line in depth.

Their taste was fresh, and to all appearances they had retained their otherwise natural condition.

The length of time that they had been so preserved could not be definitely ascertained, but the information obtained was that they kept fresh and sweet for a long time, and that they were always ready for cooking.

Recalling this method of preservation of potatoes, the writer

addressed a note to Passed Assistant Surgeon, E. H. Green, U. S. N., requesting him to have prepared for experimental investigation under his observation during his coming Arctic cruise, of:

1st. Sound, fresh potatoes, thoroughly cleansed, dried from all adherent moisture, and packed in sugar-house molasses.

2d. Sound, fresh potatoes, thoroughly cleansed, then *peeled* and packed in like manner.

3d. Sound, fresh potatoes, cleansed, dried from all adherent moisture, *sliced* and packed in the same manner as suggested.

In the first instance it is proposed to test the value of the natural protection of the potato, and in the second and third, to observe the direct influence of the molasses as a preservative.

The use of the dense black molasses is of much more value than the ordinary commercial varieties, on account of the nitrogenized matter which it contains.

In this connection, whilst considering the subject of the Arctic dietary, which, as is well known, is that of preserved foods, as well as its relations to the prevention of scurvy, attention has been called to the use of raw fresh meat, both as to its preventive as well as curative properties, and the suggestion that these qualities are dependent upon the lactic acid which exists in fresh meat juices.

Some recent patents for the manufacture of lactic acid and the lactates have cheapened the production of this acid for dietetic purposes to a less money value, gallon for gallon, than the ordinary vinegars of commerce. It is not considered hazardous, therefore, by the writer, to predict that it will supplant lime juice in the dietary for long voyages, and in Arctic diet tables.

1st. Because of its cheapness.

2d. That it requires no artificial admixture to preserve it.

3d. That the quantity to be used is smaller than that of lime juice, and, consequently, bulk is saved.

4th. That it is a natural element in the food.

5th. That when added to preserved meats, it supplies to them their natural acid, which appears to be destroyed or removed in the processes of their preservation, and

6th. That, from physiological reasons, it supplies an acid

naturally existing in the body, and which is known to be deficient in scurvy.

Over a century ago Blane, by his untiring efforts and earnestness, secured for the sailor immunity from scurvy by the introduction of lime juice as part of the diet table for long voyages; the writer is no less in earnest in his advocacy of the use of lactic acid under like conditions of sea life, as far preferable, for the reasons at present stated.

In brief, the prevention and cure of scurvy may be summed up in these words: "recent and fresh animal and vegetable foods." As these are not to be had in polar regions, to approach such conditions in the foods used as near as may be, should be the aim of the medical officer, upon whose shoulders rests these suggestions for the preservation of the health of the crews which physiological and chemical science dictate. These present hints have a like application to all expeditions and researches where preserved foods are a necessity for their prosecution.

T. J. TURNER, *Medical Director, U. S. N.*

WASHINGTON, March 27, 1884.

QUALIFICATIONS OF A GOOD SEA COOK.—A sea cook is a peculiar character, requiring a special training. He must know how to prepare a sea-hash out of salt-horse flavored with onions, incrusted with the variegated browns of polished mahogany, and savory enough to create an appetite in a stomach that the tossing waves have rendered as sensitive as the needle of a compass. He must also understand how to make eatable bread, and take his duff out of the kettle on Sunday as light as cotton and as delicate as sponge-cake. Besides this, he must know how to economize in the use of water and provisions; and, more difficult yet, he must contrive to keep the crew satisfied with the mess he cooks for them, while at the same time he looks out sharply for the interests of his employer and the captain. He must also be proof against the worst weather and undeviatingly punctual to the hours of meals. It goes without saying that it is not an easy thing to find such a paragon in the galley; but when he is there, he is, next to the captain, by far the most important character on board.—*From "The Cruise of the Alice May," in the February Century.*

A PLEA FOR THE CONTINUANCE OF THE POWERS AND DUTIES OF THE NATIONAL BOARD OF HEALTH.

Remarks submitted by Dr. JAMES L. CABELL, President of the Board, before the Committee on Public Health of the House of Representatives, February 7th, 1884:*

In accordance with what I understand to be the wish of the Committee, as expressed in a resolution unanimously adopted Monday, January 21st, on the motion of Dr. Davis, I shall proceed respectfully to state the grounds on which the National Board of Health prefers its claim to be continued the agent of the General Government in the execution of such measures of a national system of quarantine as may be required by national legislation, and to explain the special features of the act approved June 2, 1879, entitled "An act to prevent the introductiot of contagious or infectious diseases into the United States," which act having expired by limitation, ought, in the opinion of the Board of Health, to be now re-enacted for the systematic protection of the country against the importation and spread of infectious diseases of exotic origin.

The National Board of Health was created by an act of Congress approved March 3d, 1879, entitled "An act to prevent the introduction of contagious and infectious diseases into the United States, and to establish a National Board of Health," which act has no limitation, and never having been repealed, is, therefore, still in force. In addition to the establishment of a Board of Health it justified by one of its provisions, which looked to the prospective inauguration of quarantine regulations, the phraseology of the first part of its title. For, after assigning to the Board in general terms the duty of investigating the causes of disease, and of obtaining information upon all matters affecting the public health, it provides specifically that

* It should be stated in explanation of the concluding portion of these remarks, that Dr. JOHN B. HAMILTON, Surgeon-Gen. of the Marine Hospital Service, appeared before the Committee, and urged that the quarantine powers and duties heretofore performed by the Board be placed under his control.

"the Board shall give special attention to the subject of quarantine, both maritime and inland, and especially to the regulations which should be established between State and local systems of quarantine and a national quarantine system."

At the date of the passage of this act in the second session of the 45th Congress there existed an unrepealed law enacted at the first session of the same Congress, and approved April 29th, 1878, entitled "An act to prevent the introduction of contagious and infectious diseases into the United States." Under the provisions of that act the Supervising Surgeon-General of the Marine Hospital Service was to be charged with their execution, and was to be authorized to "frame all needful rules and regulations for that purpose, which rules and regulations should be subject to the approval of the President, but should not conflict with or impair any sanitary or quarantine laws or regulations of any State or municipal authority which then existed or might thereafter be enacted." On a prior occasion, namely, in the session of 1873–4, following the yellow fever epidemic of the preceding summer, a proposition for the formation of a quarantine board, to consist of the Surgeon-Generals of the Army, Navy, and Marine Hospital Service, respectively, had been defeated in the Senate, as being contrary to the well-settled policy of the government from its very foundation, not to interfere with the quarantine powers possessed and exercised by the States separately. The Committee, in reporting the bill, had, indeed, endeavored to meet this objection by providing that the regulations to be made under the act should in nowise interfere with the regulations of the several States. But it was contended by the distinguished Senator from Ohio that there would be very great difficulty in that, for the regulations of the States are different one from the other. "How," said he, "this Board is to make any general regulations that will be effective and not interfere with the State regulations I do not clearly perceive." These remarks of Senator Thurman seem to have killed the bill, as no further action was taken. It was, therefore, a matter of considerable surprise to the country, when the 45th Congress enacted the law just referred to as having been approved April 29, 1878.

We are warranted in assuming that its enactment was

brought about by an oversight, for the same Congress which had passed the bill refused at the same session to make any appropriation for the execution of its provisions; and at the succeeding session, as we have seen, while the act was nominally in force, the same Congress directed the National Board of Health to give special attention to the subject. The act in question thus became a dead letter, and no attempt was made to execute it except in one notable instance, which gave rise to very hard criticisms by the quarantine officer of the port of New York, and by the Senators of that State on the floor of the Senate chamber. I refer to an order issued by the Treasury Department under the provisions of the act, and presumably by the advice of the Chief of the Marine Hospital Service, prohibiting the importation into the United States of "rags, furs, skins, hairs, feathers, boxed or baled clothing or bedding, or any similar articles" coming from Southern Russia by way of the Black Sea or the Sea of Azof, and declaring that no vessel having such articles on board from that quarter should enter any port of the United States. The letter of Dr. Vanderpoel, health officer of the port of New York, and the remarks of Senator Kernan, will be found in the Congressional Record for the first session of the Forty-sixth Congress, April 30, 1879, in the discussion of Senate bill 108. It was shown that most extensive and important commercial and manufacturing interests had been most unnecessarily jeopardized by an order based on wrong premises and exhibiting utter ignorance of the channels of trade by which Russian rags could reach this country.

Not satisfied with the provisions of the act approved April 29th, 1878, which, though still remaining on the statute book, had proved to be a dead letter for want of appropriations, the Supervising Surgeon-General of the Marine Hospital Service had, in the second session of the Forty-fifth Congress, just after the widespread and devastating epidemic of the summer and fall of 1878, caused to be introduced a bill creating the office of a director of health, with plenary and autocratic powers in matters of quarantine. This officer was also to have charge of the marine hospital service. This bill was apparently strangled in the committee to which it was referred. The Senate Committee reported instead a bill creating a bureau of public

health, to be composed of the Surgeon-Generals of the Marine Hospital Service, of the Army and Navy, and a board to consis of seven members from civil life. This bill passed the Senate, but was defeated in the House of Representatives, and then the act establishing the National Board of Health, as now constituted, was passed, and approved March 3d, 1879, at the very close of the session.

As already stated, that act provides, among other things, that the Board thereby constituted "shall give special attention to the subject of quarantine, both maritime and inland, and especially as to regulations which should be established between State and local systems of quarantine and a national system of quarantine." This provision of the act in question manifestly implied two things—first, that Congress did not regard state and local systems of quarantine as adequate to meet all the emergencies that had arisen or that might arise in the prevention of the introduction of contagious and infectious diseases into this country from foreign countries, and that there existed insuperable objections to any attempt to enforce practically the provisions of an act approved April 29, 1878, which conferred independent quarantine powers upon the Supervising Surgeon-General of the Marine Hospital Service. In the second place, it was fair to infer that Congress contemplated the ultimate establishment of a national quarantine system of such a kind and with such regulations as would secure harmony of action with State and local quarantine authorities, and at the same time would give a complete and effective system of sanitary defenses against the introduction of infectious diseases from foreign countries.

At the date of the passage of this act it was, doubtless, supposed that the 46th Congress would not assemble until the usual time in December. In the meantime the Board of Health was required to prepare a report on the subject of quarantine, with special reference to the regulations which should be established between State and local systems of quarantine and a national quarantine system. But an extra session having been called, the new Congress proceeded immediately to undertake the solution of the problem which its predecessor had assigned as the duty of the National Board of Health. The first tentative effort in this direction was made by means of Senate bill

108, 46th Congress, introduced March 24, 1879, by which ample quarantine powers were proposed to be conferred upon the Board of Health, then recently created by the constituting act, approved March 3d. This bill encountered the most determined opposition on grounds identical with those which had been successfully urged against all preceding attempts to centralize quarantine powers in conflict with the traditional policy of the General Government. By a decisive vote the bill was recommitted with instructions to the committee to divest it of the obnoxious features. Having been so amended in the committee as to completely change its complexion in regard to this matter, it finally passed both branches of Congress, and was approved June 2, 1879.

In the course of the discussion in the Senate the advocates of the original bill were reproached for having framed it under the advice of a board composed of medical men who knew nothing of the important interests of commerce. A comparison of dates suffices to refute this charge. The bill was introduced March 24th. The commissions of the first appointed members of the Board are dated March 27th, and the first assembling of the non-resident members for the organization of the Board did not take place until April 2d. The objectionable features had been borrowed from bills introduced in the preceding Congress in the interest of the Marine Hospital Service, with only the substitution of the newly-created board of health for that bureau of the Treasury. The Board, after its organization in April, *was* consulted as to the amendments made in the Committee and incorporated in the act as it finally passed, and was approved.

This act inaugurated a novel system of co-operative work in which the Board, as the national agent, and the State and local quarantine authorities were to exercise respectively their appropriate functions. The national authority is required in order to secure—

(*a*) International sanitary co-operation.

(*b*) The collection and distribution of sanitary information.

(*c*) The preparation of maritime sanitary regulations.

(*d*) The enforcement of maritime sanitary inspections in foreign ports.

(*e*) The erection and maintenance of refuge stations.

(*f*) The aid of State authorities.

(*g*) The organization of quarantines where none exist.

(*h*) The power to add necessary rules to any deficient quarantine.

The State authority is required to secure the organization and maintenance of efficient quarantine service at ports within the States. This duty includes—

(*a*) The inspection of vessels.

(*b*) Provision for the care of vessels not infected with cholera or yellow fever.

(*c*) A competent health officer.

(*d*) Making and enforcing rules and regulations governing the quarantine.

Many interesting and important illustrative details might be stated under each of the items of this schedule, but it would consume more time than the Committee could probably spare.

The act was designed to have the effect of so uniting the national and the local agencies in the common defense of the States and the nation against the invasion of a common enemy as to secure perfect harmony of action and to avoid all risk of exciting the fears of sensitive commercial communities lest the great interests of commerce should be compromised and endangered by undue interference of the central authority. Inasmuch, however, as the system was to a large extent a novel experiment, a Southern senator, whose constituents were specially interested in the objects of the bill, proposed that its operations should be limited to four years, and the proposed amendment was accepted by the patron of the bill. It is understood that before the time was half out both senators were so well satisfied of the efficiency of the system as to become earnest advocates of a repeal of the limiting section.

This, gentlemen of the Committee, is the act which the Board of Health now asks Congress to re-enact, and bases this request upon the beneficent effects which attended its operation during the four years that it was in force. For conclusive evidences of the character and value of these results, I would respectfully refer to a report made to the Senate Jan. 26, 1883, to accompany bill S. 2259, 2d session of the 47th Congress, by Senator Harris from the committee to investigate and report the best means of preventing the introduction and

spread of epidemic diseases, to the testimony of the Memphis Cotton Exchange and kindred bodies in Little Rock, Shreveport, Vicksburg, and elsewhere; of the general superintendent of the Mississippi and Tennessee railroad, and of officers of other leading railroad lines; of the superintendent of the St. Louis and Vicksburg Anchor lines of packets, and of the representatives of various other similar lines of railroad and packet companies, all of which will be found in the *Annual Report of the National Board of Health for* 1880, *Appendix S*, p. 617.

Attention is also specially invited to the very significant fact that nearly all the quarantine authorities of the United States have put on record official expressions of their cordial approval of the system, and several have petitioned Congress for the re-enactment of the law of June 2, 1879, to be executed under the auspices of the National Board of Health. An attempt has been made to depreciate the value of this latter testimony by the absurd allegation that it is the testimony of interested parties who expect to get a share of the funds placed at the disposal of the Board of Health. This charge cannot be sustained. A large majority of the parties in question have never received the slightest amount of pecuniary aid from the Board, either directly or indirectly. This is true of the State Boards of Health of New Hampshire, Connecticut, New York, Iowa, Kentucky, Alabama, and many others. In no case was money turned over to any State or local authority. The aid has consisted in establishing refuge stations to which infected vessels might be sent by the quarantine authorities of the ports of arrival, and in instituting inspecting stations for inter-State sanitary inspections, thus indirectly conferring inestimable benefits to the States in a way for which they could make no provision, but without furnishing them with a single dollar.

The refuge stations established on remote uninhabited islands belonging to the General Government, have proved to be of inestimable value to the quarantine authorities of the neighboring ports, since they supply a desideratum in the prevention of the introduction of contagious and infectious diseases, which could not otherwise be obtained, but in no sense can their appreciation of this fact and the force of their testimony be discredited as coming from interested witnesses. It is this very interest which imparts a special value to their testimony.

By the constitution of the Board of Health, the General Government is represented by four detailed officers from different departments, one medical officer of the Army, one medical officer of the Navy, one medical officer of the Marine Hospital Service, and one officer from the Department of Justice, while the States are represented by seven members to be appointed by the President, by and with the advice and consent of the Senate, not more than one of whom can be appointed from any one State. Such a constitution of the Board met the approval of sanitarians all over the Union, with scarcely an exception. The members from civil life were selected for their real or supposed devotion to sanitary science. They were recommended to President Hayes by representatives of the American Public Health Association, the leading, indeed the only national voluntary association of sanitarians of this country. The duties of surgeons of the Army and Navy are such as to require a special training in sanitary science as a part of their professional education, and although this cannot be said to be the case with the Marine Hospital Service, of which the duties relate rather to curative than to preventive medicine, it was conceded that this branch of the public medical service should have its representative, who should have equal rights and privileges with those of other members.

Of the three branches of the National Medical Service it possessed the least claim on the score of experience, or of special training for sanitary work, and yet it now asserts a claim to be the exclusive depository of the powers to be conferred by acts of Congress in respect of that branch of sanitary work which, of all others, is the most difficult and responsible, and which requires the highest degree of prudence and discretion in the adjustment of the delicate relations between the national authority on the one side and the State and local authorities on the other.

This extraordinary demand is attempted to be justified by the assertion that the Marine Hospital Service, as a bureau of the Treasury Department, possesses, without the necessity of special purchase or special organization, all the machinery needful for the execution and enforcement of quarantine regulations. I shall show that this statement is not supported by the facts of the case, and that the expenses incurred by that

service in dealing with epidemics, and in the disbursement of the epidemic fund placed under the control of the Treasury Department, largely exceeded any ever incurred by the National Board of Health in emergencies of similar character and of equal magnitude. But I desire first to say that under cover of a plausible statement as to opportunities for *executive* work that service has persistently aimed to obtain entire and exclusive control of the quarantine, and to lay down principles and frame regulations which closely affect the interests of commerce and those of the public health. If there were really any ground for the claim of special fitness for executive work in connection with quarantine, it would only be necessary for the Board of Health to request the President to detail some of the officers of that service for temporary duty, to act under the direction of the Board, in conformity with the provisions of section 7 of the act which it is proposed to revive. In this way, whatever advantages the Marine Hospital Service may possess for such *executive* work, would be fully utilized. I hazard little in affirming, however, that the chief of that service will not be satisfied with such an opportunity of doing the work. His aims are much higher and more exclusive.

I add that there is really no ground whatever for the allegation that his bureau possesses the necessary machinery for carrying on the work inaugurated by the Board of Health. The machinery for the only quarantine work which the Board could undertake—that, namely, of the refuge stations—is peculiar, and is not to be found to hand by the Marine Hospital Service. So true is this that the machinery loaned by the Board of Health, after the lapse by limitation of the act of June 2, 1879, constituted the exclusive equipment of the Marine Hospital Service when acting last summer under the orders of the Secretary of the Treasury in the disbursement of the epidemic fund appropriated by Congress. The alleged economy is also easily shown to be fallacious. The employment of officers of the Marine Hospital Service for this work necessarily detached them from the appropriate work of their own service. If there be a surplus of officers in that service, the true interests of the Government and of the people would seem to require a reduction.

Hitherto the Board of Health has asked for a few details from the army and navy—chiefly of experts in science—for special investigation relating to the causes of disease. But in respect of the execution of quarantine duties at the refuge stations, it was deemed best in the interests of the subjects of yellow fever, and as subserving harmony with State authorities, to engage the services of yellow fever experts recommended by the local authorities of the State which was to be protected. That Dr. T. S. Scales, of Mobile, a physician of large experience in the treatment of yellow fever, and accredited by an honorable reputation, was recommended by the authorities of the Gulf States for the Ship Island station; Dr. Wm. H. Elliot, of Savannah, in like manner, by the authorities interested in the station at Sapelo Sound, and Dr. F. L. Galt for the station in Hampton Roads. But in this latter case the station was never adequately equipped, and no occasion arose for calling on Dr. Galt to assume charge. These stations were maintained in full force for a small portion of each year—the expenses during the remainder of the year being limited to the wages of a few watchmen for the preservation of the property.

In accordance with the letter of the act approved July 1, 1879, entitled "An act to provide office rooms for the National Board of Health, and for the publication of its reports and papers, and for other purposes," the Board of Health "erected *temporary* quarantine buildings" on Ship Island, but though temporary in the sense of being constructed of unpainted wood, they are admirably adapted for their uses in a mild climate, and can be kept in repair for an indefinite number of years at a small annual cost.

The Supervising Surgeon-General of the Marine Hospital Service has condemned the Ship Island Station on account of alleged faulty location, and with a confidence bred of ignorance of the facts has asserted that one of the Chandeleur Islands, or the Grand Gozier, would be a much better place for the quarantine. Accordingly, without hesitation, he has submitted estimates for condemnation of site and erection of hospital, warehouse and wharf, amounting to $65,000, more than three times the cost of the Ship Island buildings, which we aver to be fully adequate to the necessities of the quarantine

service. In view of this action by the Supervising Surgeon-General, the Treasury Department directed one of the officers of the revenue service to investigate the question as to the alleged unfitness of Ship Island and the superior advantages of any other locality. This officer, Capt. Lay, after a thorough investigation, reported that there was no reasonable objection to Ship Island, which was ten miles from the main land, and which had such an extent of anchorage for vessels of large draught that the quarantine anchorage was fully two miles from that of other vessels. He states that the islands designated by Dr. Hamilton were out of the question, for want of sufficient depth of water, and added that Ship Island was the only suitable location on the entire coast, a fact which the National Board of Health had ascertained before it commenced operations at that place.

I would respectfully invite attention to the fact that for two years in succession a contingent appropriation of $100,000 was made and placed at the disposal of the National Board of Health, to be available in the event of an outbreak of epidemic disease, and that not a dollar was used in either year. During both years yellow fever existed in one of the Southern ports—Key West, in Florida—and it was competent for the Board to open the fund in question for combating the disease at that place and for preventing its transmission to other parts of the United States. The reasons which induced the Board to abstain from making the large pecuniary outlay which would have been necessary to establish quarantine inspections and to enforce quarantine regulations at that port were fully stated in the annual report for 1880.

During the year ending 1882, small-pox prevailed as an epidemic, chiefly among recently arrived immigrants, in several parts of the Northwestern States, and in anticipation of the necessity of using the contingent fund then under the control of this Board, an account was opened with that fund on the books of the Treasury, but by strict economy it was found that the expenses of the immigrant inspection service could be met during the remainder of the fiscal year out of the general fund, and thus no portion of the contingent appropriation was used.

The allegation that the Marine Hospital Service is enabled, by its constitution and by its relations with other bureaus of

the Treasury Department, to execute quarantine duties with less expense to the Government than will be incurred by the Board of Health, has already been partially considered, and it has been shown that whatever savings of a special appropriation may result from the employment of salaried officials of the Treasury Department is illusory and deceptive as regards actual economy. These officers are paid regular salaries for other work, from which they must be detached in order to execute and enforce quarantine regulations. Moreover, when their aid is necessary in emergencies, they are required by the law of 1799 to extend it on the demand of the States, and when deemed expedient by the President of the United States, they may be detailed for temporary duty under the direction of the Board of Health, in conformity with the provisions of the act now proposed to be re-enacted, quite as readily and as conveniently as under the supervision of Dr. Hamilton.

But, in point of fact, the actual expenditures by this officer out of the epidemic fund assigned to him by the Secretary of the Treasury in the summer of 1882, very largely exceeded those of the Board of Health in the execution of similar duties. Notwithstanding the privilege conceded to the Marine Hospital Service to employ its own officers and other Treasury officials, whose regular salary was not chargeable against the epidemic fund, the actual expenses incurred in combating a local outbreak in Brownsville, Texas, more than quadrupled the cost to the National Board of Health of stamping out a similar outbreak of much larger proportions which occurred at the same time in Pensacola, Florida.

Dr. Hamilton, in his last annual report, states that "up to June 30, 1883, the entire expenses on account of the epidemic appropriations for both years were $54,678.10." This phraseology was, doubtless, intended to impress the reader with the notion that the work which had cost $54,678.10 extended over a space of two years, with the appropriation of $100,000 each. In point of fact the epidemic fund for the fiscal year ending June 30, 1883, was turned over to the Marine Hospital Service August 7th or 8th, 1882. And although the appropriation for the succeeding fiscal year was made by act of Congress March 3d or 4th, 1883, it was not available until July 1st of that year, so that "up to June 30, 1883," the work

for which the expenditure of $54,678.10 was made, instead of covering "both years," with two available appropriations, did not extend beyond a period of something less than eleven months, and was really limited to only a small fraction of that time.

Dr. Hamilton has nowhere in his Annual Report given any further details as to how and where the amount was expended, but inasmuch as there was no other epidemic under his treatment save that of Brownsville in the fall of 1882, and he was prevented by his superiors from carrying out a purpose of making a wholly unauthorized expenditure as a measure of prevention in Pensacola in the succeeding spring of 1883, it may be safely assumed that the whole or nearly the whole of the amount in question was expended at Brownsville. Now, it should be remembered that at the same time Pensacola was suffering from a similar epidemic of threefold larger proportions and much greater malignity, and that the disease was confined to that place without any expenditure for the payment of guards to confine it by a *cordon sanitaire*, and at an expenditure of the national funds by the National Board of Health not exceeding one-fourth or even one-fifth of the amounts expended by the Marine Hospital Service at Brownsville, and also that in 1879, when a terrible epidemic raged in Memphis, and lesser outbreaks existed in New Orleans, in the Teche country, and at various points elsewhere, the disease was confined to these several *foci* at an aggregate cost considerably less than was incurred by the Marine Hospital Service at this one locality in Texas. In not a single case was the barbarous practice of shutting in the entire population by a cordon ever resorted to. The greatest triumph of modern sanitary science in respect to stamping out epidemics has been achieved by the process of depopulating a town in which the disease has just begun to appear, so as to remove the susceptible persons from the sphere of infection; with due precaution as to the disinfection of baggage and other *fomites*, this may be done without danger. To shut in all the population is to insure the continuance of the disease as long as susceptible persons are on hand.

Allusion has been made to certain unauthorized expenditures which Dr. Hamilton desired to make, and actually offered to

make, at Pensacola, in April, 1883, but in regard to which he was overruled by his superior at Washington. He had positively refused to extend aid to the authorities of Pensacola during the prevalence of the malignant epidemic in the fall of 1882, because they objected to his proposition to assume entire control and to apply the same measures which he was applying at Brownsville at such unnecessary cost and in violation of the principles which have received the sanction of most modern epidemiologists, principles which governed the action of the National Board of Health in dealing with the local outbreaks of 1879 at Memphis, New Orleans, and elsewhere.

Being anxious, however, to induce the authorities of Pensacola to appeal to the Treasury Department for aid in the succeeding year, as a possible means of influencing the decision of the President as to the disposition of the epidemic fund for that year, Dr. Hamilton went in person to Pensacola in April, 1883, before the President's decision was made, and, having called the local Board of Health to meet him, made to the Board the following remarkable proposition, "which," he said, "he was sure the Treasury Department would ratify." The Treasury Department will assume charge of the quarantine station at this port (Pensacola), and manage it without any expense to the city of Pensacola. It will conduct it *under* ITS *own regulations as at present existing, and such additional ones as experience may demonstrate the necessity of*, and in harmony with such suggestions as may be agreed upon by the Board of Health. As the representative of that Department, I, (Dr. H.), will have prepared instructions relative to the mode of fumigation and disinfection of vessels, discharge of ballast, and the inspection and general sanitary condition of all vessels entering the port. In these matters, *the Department must use its own methods, without, however, interfering with the State and local laws, which it has no desire to conflict with.*"

So far little exception needs to be taken, except for the unwarrantable assumption of the President's future decision before he had made any, and for agreeing to pay the entire expenses of quarantine operations for the city. But this was followed by a most extraordinary proposition:

"Aid will be extended to the Board of Health of Pensacola, in order to effect and maintain a thorough sanitation of the

city. First, in the payment of bills for the removal of garbage during the months of May, June, July, August, September, and October. The garbage shall be systematically collected and removed from every house and building or enclosure, under a contract made by the Board of Health, the contractor to give bonds satisfactory to the Board for the faithful performance of the work, and providing for liquidated damages in case of failure," &c.

"Contracts to be made also for temporary drainage and for the cleaning up of the principal streets. The drains to be opened, gutters made under the direction of the city engineer, and approved by the Board of Health. The contracts to provide that the work shall be commenced within the earliest practicable time and completed within 30 days from signing, otherwise the contractor to be subject to a stipulated demurrage in case of default. The work to be paid for under like restrictions as that paid under other contractors," &c.

"No quarantine fees for discharging of ballast or for fumigation and disinfection will be exacted from vessels entering this port during the quarantine season."

The nature of these contracts proposed by Dr. Hamilton indicated so great an ignorance of the limits of the authority of the General Government in such matters, under existing laws, as to demonstrate his unfitness to be invested with discretionary powers in the excution of quarantine regulations, which involve questions of delicacy and importance with reference to the adjustment of the relations betwen the States and the central authority.

The National Board of Health has encountered during the last two years peculiar difficulties, against which no human foresight could have provided. In the discussions on the Sundry Civil Appropriation bill during the last hours of the session the most extraordinary misstatements in regard to the official acts of the Board were made on the floor of the House of Representatives, where, presumably, they exerted a very damaging influence, as there could be no opportunity to correct them. Some of these were stated, by the members who made them, to have been derived from Dr. Hamilton, who had employed his assistant, serving as a detailed member of the Board of Health, to collect items of expenditure in order to exhibit in a false light certain scientific investigations for which that officer had himself voted as a member of the Board.

These extraordinary and secret procedures on the part of an

officer of the Government towards a legally constituted Board in the service of the same Government, and on which his own bureau was represented by a detailed officer, is now attempted to be excused by himself and his immediate adherents by the avowal, openly made, that "this is a matter of official life or death" to him. He apprehends the possibility of a future decision on the part of Congress not any longer to superintend the medical treatment of a particular class of men (sailors of the civil marine) from whose wages a compulsory deduction is made for this purpose. He apparently fears that the Marine Hospital Service may be extinguished unless some other functions are assigned to it of a character less likely to be subject to be withdrawn.

Thus this persistent effort to divest the National Board of Health of the most important of all its natural functions—that of preventing the recurrence of epidemics—is not based upon public considerations, but on the prospective needs of the Marine Hospital Service, for which it is desired to make adequate provision by way of anticipation of a possible injury.

Respectfully submitted on behalf of the National Board of Health.

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*Some facts relating to the origin of the National Board of Health, with reasons for believing that a Board is to be preferred to a single officer, and that the present plan of organizing the Board is the best that has been devised.**

BY STEPHEN SMITH, M.D., OF NEW YORK, MEMBER OF THE BOARD.

I learn that at a recent meeting of the Committee on Public Health, my friend, Dr. J. B. Hamilton, Supervising Surg.-Gen. of the Marine Hospital Service, read a letter from me to him in relation to the question of the performance of quarantine duties by that service. The purport of that letter is liable to misconstruction if the circumstances under which it was written are not understood. I beg, therefore, the privilege of ex-

*This paper was sent in the form of a letter to the HON. LEWIS BEACH, of New York, Chairman of the Committee on Public Health of the House of Representatives, in explanation of a letter read to the Committee, by DR. JOHN B. HAMILTON, Surg.-Gen. of the Marine Hospital Service, in the course of his remarks in favor of transferring the quarantine duties of the Board to his Service.

plaining to the committee the events bearing on the subject of that letter, as they came to my personal knowledge. I feel greater liberty in asking this favor, as the whole subject of the relations of the National Board of Health, and of the Marine Hospital Service, to the discharge of public health duties, seems to be under consideration by the committee. To do so intelligently, however, I must refer to the history of the creation by Congress of a National Board of Health. With that history, from the first suggestions of a National Board of Health to the present, I am personally familiar.

For a quarter of a century I have been interested in the efforts of sanitarians to introduce into this country the health laws and organizations of England, which have so marvelously improved the health of her communities. But it required twelve years of incessant work to secure the enactment of the law that gave New York city its present excellent and popular board of health. Seven years of duty as member of that board convinced me that its efficiency and success depended upon the fact that it was a *board* having a membership representing various sanitary interests. It required fifteen years of agitation to secure the law which gave the State of New York a board of health, which is now one of the most popular branches of the State Government. These facts, which can be indefinitely multiplied, show the persistent efforts required of the pioneers of this reform to create adequate health organizations.

But though once created with so much labor and effort, every practical worker in this field knows, by painful experience, by what slight tenure they maintain their early existence. Jealous opponents, callow sanitarians, and partisan politics always lie in wait, ever ready, when the occasion offers, to strike a damaging or fatal blow. Discouraging as are the efforts necessary to secure a good health organization, the struggle to maintain it against the arts of designing men who seek its control or destruction, for personal or partisan purposes, is always most disheartening. It is always so much easier to destroy than to establish and maintain Boards of Health, that they seem to be the special targets for criticism and detraction.

These statements are made as an apology, if any is needed, for the desire I have manifested to protect the National Board of Health from threatened antagonisms.

Upwards of twelve years ago some of the more advanced leaders in sanitary reform became impressed with the belief that the system of health organizations of this country could never be complete until the following scheme was perfected, viz:

1. *Local Boards of Health*, to protect the individual and families from domestic causes of sickness and death.

2. *State Boards of Health*, to prevent the spread of domestic contagious diseases by co-ordinating the work of local boards, and co-operating with them, and the removal of the causes of disease which extend widely over the State.

3. *A National Board of Health*, fully empowered, 1st, to investigate the causes and methods of prevention of domestic pestilences, widespread among the States and Territories, and aid local authorities in their suppression; 2d, to prevent the introduction of foreign pestilences into the country and their spread from one State into another, by co-ordinating the operations of State boards, and co-operating with them; 3d, to examine and determine public health questions of international importance.

In the opinion of several gentlemen, the time had then come when it was proper to make the effort to secure from Congress the legislation necessary to the organization of a National Board of Health. Accordingly a meeting was held in Washington, to which representatives from the Army, Navy, and the Marine Hospital Service were invited. The conference continued two or three days. The discussion of the subject developed the fact that there was much jealousy between the Departments at Washington as to which would be most prominent in the new organization. The contest lay chiefly between the representatives of the Army and Marine Hospital Service, both of which finally took strong ground against any plan which did not make their respective service the central figure of the proposed Board. The conference closed without accomplishing anything farther than requesting Dorman B. Eaton, Esq., of New York, author of the New York City Health Law, to prepare a bill creating a National Board of Health. Mr. Eaton prepared a bill, which was very nearly in the terms of the bill creating the present National Board of Health. As this bill placed the Departments on the same footing in the

Board, the Army and Marine Hospital Service both rejected it, and it was never presented to Congress. From that time until 1879 both the Medical Department of the Army and the Marine Hospital Service endeavored to secure from Congress such legislation as would make their respective services most prominent in sanitary work. The Medical Department of the Army was authorized by Congress to investigate the quarantines of the United States and the outbreak of cholera in the Southwest; and the Marine Hospital Service was empowered to establish quarantines where none existed, etc.

The great epidemic of yellow fever of 1878 brought the whole subject of a National Board of Health prominently forward, both before the public and before Congress. The American Public Health Association, which represented all the sanitarians and boards of health in the country, became the special medium of the public health interests in securing legislation. A great variety of bills were introduced into Congress, organizing a health bureau, and the whole subject was most thoroughly discussed in Congress and throughout the country. This was especially true of the question, early raised and persistently urged, as to the propriety of conferring upon the Marine Hospital Service the necessary sanitary powers and duties. This scheme was rejected by the Public Health Association, by all sanitarians with one or two exceptions, and, finally, by Congress. The bill which passed created a board of health composed of seven members appointed by the President and Senate, and four members, *ex-officio*, one from each of the Departments, viz., Med. Dept. of the Army, Navy, Marine Hospt. Service, and the Dept. of Justice.

This constitution of the Board was originally provided by Mr. Eaton in the bill referred to, who, from personal examination of the health organizations of Europe, and as author of the health law of New York city, brought to the task of preparing a bill organizing a National Board of Health unusual skill and experience. Theoretically, no better method could be devised of creating a board which at once was representative in its character and combined the several departments on an equal and equitable footing. Practically, the wisdom of the originator of the plan of creating the Board has been fully demonstrated. The members appointed by the President were all eminent in the

sections of the United States which they represented for practical personal knowledge of the administration of health laws and familiarity with epidemic and pestilential diseases, and the members *ex-officio* brought to the counsels of the Board the varied knowledge and experience of the Army, Navy, Marine Hospital Service, and Dept. of Justice. The law was so drawn as to enable the Surg.-Gen. of the Army, the Surg.-Gen. of the Navy, and the Surg.-Gen. of the Marine Hospt. Service to be detailed as members of the Board. Dr. Woodworth, then Surg.-Gen. of the Marine Hospt. Service, expressed to me his intention of personally representing his service, and doing all in his power to make the National Board of Health a "grand success."

It is proper for me to say in this connection that among the bills before Congress during the session was one which associated a board of health with the Marine Hospital Service, with ample powers to perform sanitary duties. I had reason to believe for a time that this was the only health measure that would pass Congress, and as it answered in many respects the purposes which we had in view, I favored it, in common with Dr. John M. Woodworth, Supervising Surgeon-General of the Marine Hospital Service, who was an old and valued friend and co-worker in the field of sanitary reform. But the bill was rejected, together with others of a similar nature, and all the health duties and powers hitherto conferred upon the Marine Hospital Service were transferred to the new Board of Health. On the day following the passage of the constituting act, viz., March 5, 1879, Dr. Woodworth was seized with a fatal illness and died a few days after. Dr. Woodworth had labored incessantly during the session of Congress to secure to the Marine Hospital Service the proposed Health Department, but failing, his health broke down completely. With his death all opposition ceased, and the National Board of Health assumed the position and the functions of the central health organization of the United States.

It was a matter of general congratulation among the sanitarians of this country and of Europe that the great national sanitary questions which our government must now consider were to be committed to the judgment of a board of health with a diversified membership rather than to a bureau with a

single head. England had but recently abolished its Health Department with a single head, and transferred all the powers and duties to a *board*, though its previous health officer was the most eminent sanitarian living. And experience has amply proved the wisdom of Congress in finally rejecting a single-headed bureau, and adopting the plan, now universally recognized in Europe and in thirty States of the Union, of committing all health powers and duties to a well-organized board of health.

The members appointed represented not only the varied sanitary interests of different sections of the country, but they were experts in a knowledge of the epidemics peculiar to their respective sections, and of the best measures of prevention. In the conflict which the Board had to enter upon soon after its organization with the great epidemic of yellow fever of 1879, the immense value of the efficient counsels and personal services of the members, familiar with the peculiarities of the scourge, and of the people afflicted, was daily apparent. Nor did the Board prove to be an unwieldy body in the execution of its duties. On the contrary, by the organization of an executive committee, composed chiefly of resident members, who could be summoned in council in ten or fifteen minutes, not only was there a rapid dispatch of business, but every item had the careful consideration of at least four expert men, one of whom was the Solicitor-General. Twice in each year the whole Board met and reviewed the past work of the executive committee, projected the future operations of the Board, and deliberated with the greatest care and patience upon those new and untried subjects which involved vital questions of public policy. And from large experience in similar bodies, I take the liberty of adding that, while there was often the greatest diversity of opinions expressed on individual subjects, there was always the most perfect acquiescence in the conclusions reached. This diversity in the discussion of sanitary questions shows the importance of a board in determining the policy to pursue in the administration of health laws, while the unanimity of the board in carrying out the decisions of the majority proves that the organization is admirably adapted for its purposes. The records of the Board will prove to any one familiar with State medicine and the problems which it presents, that

during the four years of its active existence the National Board of Health has repeatedly been required to determine public health questions of national importance which could never safely be left to the arbitrary decision of any single person. If it is true, as alleged, that a board of eleven members, seven of whom are appointed by the President for their special fitness for their duties, and four are elected from the Departments of the Government for like qualifications, is liable to, and actually does, commit grave errors of judgment, and mistakes in execution, what dangers must beset such public service when all its delicate and responsible duties are entrusted to the unaided judgment of a single person. And as a result of the deliberations of that Board the policy of the General Government in preventing the introduction of foreign pestilences into this country, and their spread from one State into another, has become the most enlightened and the most successful of any nation in the civilized world. I refer to—

1. The method of securing a good sanitary condition of ships.

2. The projected plan of international notification of the sanitary condition of foreign ports.

3. The system of refuge stations for infected vessels bound to ports of the United States.

4. The scheme of sanitary inspections of steamboats and railroad cars, to secure such cleanliness and freedom from infection as will interrupt travel and traffic to the least possible extent during the prevalence of an epidemic.

5. The system of securing the vaccination of emigrants at foreign ports and on shipboard.

6. The system of railroad inspections of emigrants, to prevent the spread of small-pox.

After two to three years of successful work, during which the Board had apparently gained the confidence of sanitarians and sanitary authorities at home and abroad, I learned from my friend, Dr. Hamilton, the successor of Dr. Woodworth as the head of the Marine Hospital Service, that he regarded all the duties relating to quarantine, conferred upon the National Board of Health by the law of June 2, 1879, as properly belonging to his service. It was in response to expressions which seemed to me antagonistic, and foreshadowing a determination

to seek the necessary legislation to secure his object, that I deprecated any hostile movement against the Board as liable to end in a loss of all that had been gained. As a measure which would place both departments in harmonious relations, without loss to the efficiency of either, I revived the project in the bill already alluded to, and which was favored by Dr. Woodworth, of combining the two services. Such was the purport of the letter read to the committee.

It must be distinctly understood that the basis of the plan of uniting the two services, which was suggested, was that sketched in detail in the Stanley Matthews bill of 1879, which organized a National Board of Health in connection with the Marine Hospital Service.

In submitting this compromise measure I did not intend to indicate that I was dissatisfied with the National Board, or that the consolidation of the two services would be an improvement. On the contrary, as I have already intimated, I believed the plan of organization of the present Board the best that had been, and perhaps could be, devised. It is a representative body, and hence far more in harmony with our forms of government than a bureau with a single head; it combines in its membership every variety of knowledge necessary to judicious decision, and in its action has the force and precision of a single hand. Nor do I believe that its duties and powers should be curtailed or transferred to any other branch of the public service. The Board has fully demonstrated its ability to solve the problem of preventing the introduction of foreign pestilences into this country, and their spread from one State into another; to aid judiciously local and State boards of health in their efforts to suppress epidemics, and to organize and conduct exhaustive investigations into the causes of diseases of national concern. But more than this, all the health powers and duties of the General Government should be conferred upon and exercised by one branch of the public service, which should be fully equipped for the purpose. Divided responsibility must end in inefficiency and failure. It is doubtless true that the War Department could organize and manage a very good navy, and the Navy Department could organize and manage a very good army, and thus one department could be abolished. And equally, the Marine Hospital Service could manage very well

a health department, and the National Board of Health could easily administer the affairs of the Marine Hospital Service. But no one doubts that such consolidation of entirely different branches of the public service would tend to confusion, inefficiency, and, finally, complete failure. If one branch of service is to assume the duties of another, it must also organize all the details of the service so assumed. Nothing is, therefore, gained in economy, while much must necessarily be lost in efficiency.

The compromise was suggested solely to prevent what I foresaw would be a contention among friends, liable to degenerate into detraction, ridicule, and unseemly personalities, and which could only result in great injury to the public health service. The history of sanitary legislation proves that State medicine is a plant of slow and uncertain growth. Boards of Health are too often organized on the approach or during the prevalence of great epidemics, and when popular alarm is at its height. They cope successfully with the scourge, the public is gratified, and due credit is given to the health authority. But when the danger is past and the same board that suppressed the epidemic labors quietly and unseen to create such conditions as will prevent the possibility of a return of the epidemic, the inquiry begins to circulate in official circles, "To what purpose is this waste?" "What need is there of this useless and expensive appendage to the Government?" Then comes the period of detraction and ridicule through which every health board must pass before it can be sure of permanency. Its best preventive measures, and its most useful and successful investigations into the hitherto unknown causes of the sickness and death of the people, are held up to ridicule in legislative halls "amid roars of laughter and applause." Few boards of health pass through this period of detraction and ridicule without being crippled in their resources and largely deprived of their power for usefulness. Jenner's appeal to Parliament for assistance, after his discovery of the great preventive of small-pox in the udder of the cow, was received with unbounded ridicule and jeers. Pasteur's discovery of the infinitesimal germ that destroyed the flocks and herds of France, after an immense amount of labor in experiments, was at first first received with ridicule in official circles. Koch's announcement of the discov-

ery of the germ that causes consumption is to-day the subject of intense ridicule, in spite of the probability that this disease, which annually destroys more human beings than any, and, in some latitudes, more than all other diseases combined, may be either prevented or cured.

My earnest wish and purpose in the attempt at conciliation, was to save the National Board of Health from the perils to which it would be exposed in the infancy of its work if another department assailed it with the weapons always available against Boards of Health in seasons free from epidemics. For this reason, also, I was anxious that Dr. Hamilton should carry out the purpose of his predecessor, Dr. Woodworth, and himself be detailed to represent his Bureau in the Board. I was persuaded that if he personally shared the labors and responsibilities of the other members in the work of the Board, no antagonism would ever arise between these two branches of the public service. If, indeed, the Board has proved defective or delinquent in any particular feature of its organization or operations which could have been prevented, or remedied, by his counsel, judgment, experience, or aid, his failure to act as a member, and thus by his good offices supply, what the law contemplated, the full and cordial support of the Marine Hospital Service, is certainly much to be regretted. But the Board should be exonerated from the charge of culpability for such defects and delinquencies.

In conclusion, I beg to say that this letter has been written in the spirit of a long-existing friendship for the medical officers of the Marine Hospital Service, for whom I entertain the highest personal and professional regard. But it is my profound conviction that the interests of the people and of sanitary science will be best served by conferring all public heath duties and powers, now and hereafter to be exercised by the General Government, upon the National Board of Health.

Respectfully submitted.

INTERNATIONAL SANITARY CONFERENCES IN THEIR COMMERCIAL RELATIONS.*

The summer of 1883 will be remembered for the recurrence of one of those severe epidemics of cholera which, for years, has visited Egypt and the shores of the Red Sea. The number of lives lost and the threatening attitude which the disease maintained for many months in regard to Southern Europe, gave it more than usual interest. The mortality was much greater than was generally admitted; indeed, it is well known that interested parties took special pains to suppress, as far as possible, everything that was likely to increase the alarm.

The subject has lost none of its interest for the public; the anxiety is likely to return with the heat of the coming summer, because it is known that diseases of this kind assume a more formidable character in proportion to the distance to be traversed, the rapidity of intercommunication, and the facility with which epidemics may be carried from one country to another.

The ablest sanitarians in Europe engaged in the discussion, which was both animated and pointed. Every new feature ob-

* Proceedings of the International Sanitary Conference provided for by joint resolution of the Senate and House of Representatives in the early part of 1881. Washington: Government Printing Office.

Recueil des Travaux du Comité Consultalif d'Hygiène Publique de France et des Actes Officiels de l'Administration Sanitaire; Publié par ordre de M. le Ministre de l'Agriculture et du Commerce, Tomes I à X. Paris, Baillière et Fils, 1871 à 1881.

La Chine et les Conditions Sanitaires des Ports Ouverts au Commerce Etranger. Rapport Présenté à M. le Ministre de l'Agriculture et du Commerce, Suivi d'une Etude Sur les Quarantaines en Chine et au Japan, par le Dr. Max. Durand—Fardel, avec Cartes et Plans. Paris, Baillière Fils, 1877.

Contagion du Cholera Démontrée par l'Epidémie de l'Guadeloupe—Conditions Hygiéniques de l'Emigration dans les Pays Chauds et de la Colonisation de ces Pays; des Dangers qu'il y a á Méconnaître la Contagion du Cholera, par A. Pellarin, Docteur en Médecine, Médecin principal de la Marine, en retraite, etc. Paris, Baillière Fils, 1872.

Etudes Sur la Fièvre Jaune à la Martinique de 1669 à nos Jours par J— J— J. Cornillac, Médecin de 2d Classe, etc. Deuxième Edition. Fort-de-France. Imprimerie du Gouvernement. 1873.

served was brought in to give force to the argument, and the different theories advanced were defended by such men as Chadwick, Foville, and Petenkoffer.

The people, the profession, and even many sanitarians have not taken the pains to inquire into the history of these contagious diseases, nor to examine what has been done to prevent them from spreading to countries beyond those in which they originated. It is not our purpose to enter into a detailed history of the origin and dissemination of contagious diseases, nor to undertake a full history of the different International Conventions called to discuss the subject; but International hygiene has taken a deeper hold on the people of all civilized nations than ever before, and they are naturally desirous to know what governments are doing to protect them against such insidious and dangerous enemies.

In this notice it is proposed to give the reader interested in general sanitary questions a correct idea of the attempts that have been made to establish international hygiene on a satisfactory basis, as well as of the difficulties that have heretofore stood in the way of a mutual understanding among the nations represented, and the causes that still prevent their united action. It is not pretended to add anything new to the literature of the subject, but simply to collect facts, place them in their natural relations, and draw from them such conclusions as they will legitimately warrant. The only diseases that command serious attention in these conferences are cholera and yellow fever. Plague, typhus and the eruptive fevers are generally overlooked, because they are of less frequent occurrence, are more amenable to treatment, and more easily controlled by quarantine. The subject may be therefore conveniently arranged under different heads as follows :

1. The sources whence contagious diseases originate.
2. The means by which they are spread to other countries.
3. Quarantine as a means of protection.
4. Other means proposed.
5. Causes of the insuccess of sanitary conferences.

This statement of the case is intended for the busy man who has not the time nor perhaps the facilities within his reach to enable him to obtain such information as he might desire; the professional sanitarian, the expert, will find nothing in it to interest him.

It may be remarked that the term "International Sanitary Conference" is used to designate two distinct kinds of conventions. One considers epidemic diseases and the possibility of their being transported from one country to another, and the means by which this may be prevented. The other is international only in the sense that it is composed of delegates from different countries who meet to discuss together questions that may have a general or a purely local interest. One considers questions requiring agreement among different governments; the other those that are purely national. One requires the consent of the different governments before it can be enforced; the other needs only municipal or State sanction. One is composed of diplomatists and sanitarians who have studied the origin, mode of propagation and prophylaxis of contagious diseases, and particularly those of an epidemic character. Sanitarians whose object is to consider not only epidemic, but also endemic diseases, their origin and the best means of preventing them, generally form the other. They consider hygiene in its civic and local relations, the hygiene of the person, of different trades and professions, and, in a word, everything that relates to public health. One has been organized primarily for the purpose of regulating quarantine and preventing the introduction of contagious diseases into countries in which they did not exist.

Quarantines were established in Europe in the middle ages, to prevent the introduction of plague from the East. It was applied by the Venetians to ships carrying passengers and merchandise from countries in which diseases of a contagious nature were known to exist. It was a detention, at a safe distance from the place of landing, of vessels and cargoes, during a period of forty days, on the supposition that within that time the disease would have lost its power to infect others, and that intercourse with such vessel would be free from danger. The name is still retained, although opinions regarding the time necessary for disinfecting the ship and cargo have undergone great modifications; thus sanitarians now speak of a quarantine of five, ten, or any other number of days.

Quarantine is *International* or *National*, according as the vessels come from a foreign or a national port. International quarantine is therefore a measure relating directly to foreign

commerce and the transportation of merchandise and passengers from one country to another. It is of special interest to merchants and all those engaged in commerce, and also to those engaged in buying or selling goods brought from foreign ports. It is surprising that merchants who are so deeply interested, should take so little interest in the matter. The subject is a very practical one, and it will repay them to investigate it thoroughly. Even the mercantile journals, that so ably represent them in all other respects, are satisfied with giving the current news regarding measures that involve the detention of their ships and cargoes at foreign ports. A few technicalities excepted, there is no *class* of men who are more capable of forming a just and impartial judgment on the subject than the men who, by prudence, industry and attention to details, have been successful in establishing an extensive and profitable business. There is nothing to prevent the merchants from considering this subject; they can very readily appoint a committee from their number to consist of those having some knowledge of the subject. Such a committee could readily obtain all the information necessary to enable them to understand the nature of the difficulties that are interposed by government officials.

Statesmen, politicians, and consular agents generally, have ever assumed the right to regulate commerce, and, consequently, to frame the quarantine laws. This they have done regardless of the justice or the injustice of the rules they have adopted. But it has often proved that what is politic, is neither just nor profitable. They apply the rules of statecraft to a question into which politics should not enter. Besides, there are rivalries among States and among statesmen which often prevent them from agreeing, but above all, there are commercial rivalries which lead to the most unjust discriminations in certain cases that are an outrage on the public, and on the commercial world generally. The consequence is the interruption of trade, the destruction of human life, and general alarm to the public.

The medical expert is always an element in these inquiries; he is a constant factor in all such bodies, no matter of what other elements they may be composed. The physician has always given the greatest attention to the different contagious diseases

and their prophylaxis. Generally, there has been no disagreement among the doctors; they have, as a class, studied the nature and habits of the different contagious diseases, with an honest desire to serve the public and arrive at scientific truth. They have done more; they have studied the diseases where they originated, they have spared themselves no labor, no hardships; they have exposed their lives without hope of adequate reward; they have even sacrificed their lives, in some cases, in their zeal for scientific investigation and in the interest of humanity.

There are a few who study these diseases in the quiet of their libraries. It is convenient always to be on the side of the governments that encourage them; besides, what more natural than to find scientific men manifest an ardent desire to see their countrymen prosperous in their commercial enterprises? It has become a matter for grave doubt in the minds of those who have carefully followed these questions, whether the government leads the scientist and directs his opinions in advance, or whether the scientist lays down the immutable laws of nature as the proper guide for governments. It is a remarkable coincidence, however, that in the case of the most successful commercial nation in the world, there should be a remarkable harmony of views between the Minister of State and her leading sanitarians.

There is no class of men that has rendered greater service to international hygiene than the medical corps of the different navies. They are generally actuated by a love for the noble profession they have chosen; they are in a great degree independent of accidental circumstances; they have much time to cultivate their natural tastes, and they are stimulated by the advantages of foreign travel. Give them the honor which belongs to them.

It is equally certain that the seamen in the merchant service are, of all Europeans, the most exposed to contagious diseases in infected ports, and they are the least protected. The ships on arriving in port are generally obliged to take whatever position is assigned to them in the anchorage or at the docks; this may be in the very centre in which disease is raging, and the crews are subject to the very worst hygienic conditions. They have been transported from a cool and healthy atmo-

sphere, to one that is poisoned with the elements of disease. They are exposed to the scorching rays of a tropical sun. They soon lose their natural vigor, the work of discharging the cargo and reloading is debilitating. They sink under the accumulated weight of fatigue and incipient disease. The infection finds its way into every corner of the ship, and if the crew keep on foot long enough to leave port, they are stricken down before they are many days at sea. The result is easily imagined. Public hygiene has thus far done nothing for that class of human beings; they are often treated worse than cattle. Is there no remedy for this outrage on unoffending victims? They have committed no offense, and they are certainly the victims of circumstances over which they have no control. They are made the medium of bringing disease to places in which it would not exist but for them.

It has been truly said that "Nations have an inherent power to prevent, without any breach of their international obligations, the introduction into their territories of contagious or infectious diseases." Contagious diseases may justly be considered as a foreign enemy, and people have a right to expect and to demand protection from their respective governments.

Quarantine is the oldest means of protection. In 1848, by an Act of Parliament, England declared that protection lay, "not in quarantine, but in *Internal Sanitary Measures*." This means has been tried, but it has failed to give the desired relief. Those vague propositions advanced in the form of a *dictum* are very captivating. They spread rapidly; they are easily remembered; they always afford the maker the means of interpreting them as circumstances may render most convenient. Do *Internal Sanitary Measures* mean that perfect sanitation at home affords a complete protection against the introduction of disease, even though it be introduced from a neighboring port? Would England consider herself justified in admitting to her wharves passengers and goods from a ship carrying cholera, yellow fever or plague? As well might she admit into her schools or other public places a person having small-pox or scarlet fever. Perhaps the dictum means internal sanitary measures at the *port of departure?* Then let England put that system in practice at Bombay, Madras and Calcutta. But internal sanitary measures may apply to ships engaged in

transporting passengers and merchandise from one port to another. If this principle be followed to its legitimate conclusion, internal sanitary measures as practical means of preventing the spread of contagious disease is a fallacy. *Universal Sanitary Measures* is the principle. Then physician heal thyself; begin by cleaning the Augean stables in your Indian possessions on the banks of the Indus and the Ganges, the source whence cholera originally sprang, and whence it is sent out every year in ships bearing the English flag and clean bills of health, to spread terror through the world. It is a maxim in law: "*Sic utere tuo ut alienum non laedas*," and nations have a right to insist that you shall not bring disease to those whom they are bound to protect.

The only concession of any value ever made by England in any of the five International Conferences held, was when she consented to "the establishment under international auspices —at the suggestion of France—of posts of medical observation at Mecca, Medina and all the principal seaports of the Red Sea," which "may well stimulate the desire and create the hope of achieving similar triumphs of sanitary supervision in other fields, though with a modified instrumentality."*

In speaking of the Corps of Observation established under this regulation the *British Medical Journal* declares that: "Considering the exceptional position that England now holds in the Councils of Egypt it is indispensable that she should profit by the circumstance to cause the definite abolition of those absurd and useless restrictions." And Sir Charles Dilke, President of the local Government Board, London, designates it as "that curiously effete and wrong-headed body." Dr. Cabell and Sir Charles do not agree in their estimate of the measure. The International Sanitary Conference was held in Washington before "the exceptional position that England now holds in the councils of Egypt" occurred, and before it was known that Sir Charles Dilke looked upon the Inspectors as a "curiously effete and wrong-headed body;" it was not, therefore, expected at the time that the government represented by Mr. Archibald would so soon change its opinion of the measure it had previously sanctioned.

*Dr. Cabell, opening remarks before the International Sanitary Conference, Washington, 1880.

The criticisms that have been made on the policy of England apply to other governments with varying degrees of force. The object of the United States in calling the Conference was to provide for "competent and trustworthy inspection at the port of departure." But as a means of insuring correctness in the statements made, the representative of the government to which the ship was destined was expected to verify the bill of health and endorse it to his government.

Dr. T. J. Turner, Secretary of the International Sanitary Conference, in speaking of proposition No. IV, says: "In the United States, Boards of Health are the local sanitary authorities, and in many instances do not have the power to grant bills of health."

This is equaled by the absurdity of organizing a National Board of Health, authorizing it to call an *International Sanitary Conference*, and then taking from it all means of support.

2. It is a well recognized fact that all the dangerous epidemics, especially cholera and yellow fever, have their origin in tropical climates. Errors in sanitation play a very important part in the development and extension of a great many diseases in warm climates. One cause of this is found in the fact that the pathology of warm climates is but little known, particularly in its relation to the general physical conditions of the countries so situated. A full knowledge of the conditions that favor the development of endemic and epidemic diseases in certain localities rather than in others, is very important in an etiological point of view, and a knowledge of the best means of removing the cause is equally necessary as a means of prevention. Such investigations will form the natural prelude to the removal of the diseases and the permanent improvement of the sanitary condition of the countries exposed to these diseases. A careful observer has said that: "It is now fully recognized that many of the European colonies are but the premature graves of the colonists sent out to face conditions of climate and soil for which nature did not fit them. When colonies are obliged to have recourse to constant immigration from the mother country in order to keep up the working population of the place, it must be considered as doing violence to public health and an outrage on humanity and morals."

What value can men set on their lives under such circum-

stances? Its duration is usually short—the great majority dying at an early age from hardship and privation, and Pellarin says that misery was one of the chief causes of the ravages made by cholera in 1865 in Guadeloupe. The same writer says "that the European is never acclimated within the tropics; he is unable to do a sufficient amount of prolonged work in the heat of summer to make his services remunerative, and whoever attempts to do it brings on debility and shortens his life. The possibility of becoming acclimated with time is purely an Utopia."

Inability to work under the burning rays of a tropical sun must naturally interfere with the supply of food, and the effects of deficient supply are everywhere felt among the working classes. Three-fourths of those who were badly nourished during the epidemic in Guadaloupe died, and in every instance insufficient nutrition increased the number of victims of cholera.

Nations which, like England, France, Spain, and others, maintain extensive colonies in tropical latitudes, subject the natives to the condition of slaves, exact from them heavy tributes and military service, compelling them to support expensive foreign governments in Europe, maintain precisely the conditions in which cholera, plague and other contagious diseases are most likely to be engendered and propagated. Add to this the indolence of the natives, so natural in enervating climates, their careless habits, improvidence, and their want of cleanliness, and disease will not only exist, but all the conditions for its propagation are at hand.

A writer, whose opportunity for observation was extensive, says: "In witnessing the destruction of men which took place in these countries when they were first settled, it was the general belief that they would end in depopulating the countries that were endeavoring to maintain the colonies."*

Besides the miserable and squalid condition of the natives, which favors the development of the disease, the reader must consider the effects of warm climates, of deficient nutrition, and of diseases incident to the great changes caused in the constitution by being transported from Europe to India, and it

* Histoire philosophique et politique des établissements du commerce des Européans dans les deux Indes, tome 5, p. 160. Genève, 1781.

will easily be seen how little powers of resistance remain in a constitution subject for a varying period to all the terrible diseases that have their origin among decaying vegetation in the torrid zone. Similar conditions, varying slightly in degree, exist along the shores of the Indian Ocean, and extend to the ports of the Red Sea.

In Cuba and the various ports on the Gulf of Mexico, in which yellow fever is found to be endemic, a similar condition of things is found. Favored by the heat of summer the disease often extends to places beyond the tropics, causing dreadful destruction of life, upheaving society and ruining commerce.

If, in addition to the inherent danger from the disease itself, these countries are invariably in the hands of commercial nations, which, in the pursuit of gain, disregard the injury they may do to others, provided they increase their own wealth, the danger of transporting disease is immeasurably increased. Such nations are invariably ambitious. Where commerce cannot be introduced by peaceful means it must be done by the sword, as happened in the so-called opium war with China. Thus it happens that nations which claim to be the champions of civilization, the advocates of progress and humanity, forget their self-imposed mission when the question of gain is introduced.

England is at present the pioneer in the work of foreign conquest—the civilizer, the apostle of progress. London is the great commercial emporium of the world. English ships are found in every port on the globe—in India and China, in Africa and in North and South America. She unloads her merchandise at every wharf, and her human freight at every quarantine and landing-place in the world. She sends pilgrims from the Indus and the Ganges to Mecca, and rags from Egypt to New York; her cruisers and coasters touch at every port on the Mediterranean, from Alexandria to Gibraltar, and be the freight good or bad, harmless or dangerous, they deliver it at every landing-place to which it has been shipped; the freight, of course, brings with it freight charges, but the fomites of disease are delivered free of charge.

Therefore it is that England has been charged with bringing cholera into Europe, and, according to undoubted authority and their own admission, they introduced it into China. Inspector-General Home, in the *Statistical Sanitary and Medica*

Reports, Army and Navy Medical Department, published in Lon- in 1865, after careful research on the subject, states that cholera was unknown in China previous to 1838. At that time a large body of troops, both native and English, was sent from India to China, and since that time, although there have been no very severe epidemics, China has not been free from cholera, as is shown by the annual reports. It has also been remarked that the European troops always suffer most severely, and that the number of cases is yearly increasing.

In April, 1862, during the war with the Taëpings, the native part of Shanghai, as well as the settlements, was greatly overcrowded by refugees who fled thither for safety. The troops were encamped on marshy ground outside the city, and, although in perfect health when they left Tien-Tsin a few days before, an epidemic of cholera broke out among them and extended to the city among the natives, and in the settlements, and also along the river. There are three distinct communities in Shanghai, occupying different parts of the city, each enjoying certain privileges independent of one another and of the Chinese Government—these are the English, the Americand and the French settlements. The epidemic lasted from May until November; one in eight of the Chinese population died, and of 8,000 Europeans, 1,600 fell victims to the disease. The mortality among the English soldiers was 65 per cent., and among the natives of India, 37 per cent. The officers and the civilians in easy circumstances suffered comparatively little, a circumstance which confirms the statement made before—that want and hunger, filth and improvidence do much to increase the virulence of the disease. The epidemic spread rapidly towards the north, and was very fatal; it reached Tien-Tsin about the end of *June*, but, strange enough, it did not extend towards the south.

In 1863 there was another epidemic, which lasted about three months. During the violent heat a soldier, who was about to sail for Europe, was seized with cholera. This time the deaths among the European soldiers was 60 per cent., among the *cipayes*, or Indian troops, 26 per cent., while among the civil population there were but few deaths.

The quarantine regulations established in China will serve to illustrate the principles by which governments are actuated in

dealing with public questions, particularly those relating to hygiene. It will be remembered that Shanghai is situated on the river composed of the native city, and three settlements or concessions, granted to the English, American and French Governments. The first in ascending the river is the American, which is separated from the English by the Soochaw Creek; next the English, separated from the French by the Yan-Kin-Pang; and this last from the native city by the ditch which surrounds it. From the American settlement a railroad extends to Woosung, and in front of the Chinese city is the city of junks, composed of floating habitations along the river.

In July, 1873, the French minister received from the French consul at Shanghai a dispatch from which this paragraph is taken: "When it was announced that cholera existed at Bangkok, Siam, and in the vicinity, the English consul and the representative of the American consul drew up, together with the Chinese authorities, an agreement for the purpose of establishing a quarantine against the infected places, which was to go into effect immediately."*

The quarantine regulations were drawn up by the English consul and the custom-house officer, who was entirely under English control. The representatives of other governments were simply invited to sign it. The Chinese authorities took no part in it whatever, except to give it their assent.

The report remarks, very justly, that to be of any real value the quarantine regulations should extend to all the ports of China; but under existing conditions the Chinese Government could not be induced to enter sincerely into any measure of the kind. The next best course would be to establish an efficient quarantine at Hong Kong, which is a port of entry at which all foreign vessels going to China are obliged to stop and report; but Hong Kong is an English colony, and other governments have no authority over its local regulations.

Shanghai is not a colony, but a concession, and is independent of the Chinese Government only in so far as granted by treaty stipulations. The authorities at Hong Kong may subject vessels to such regulations as they deem proper, but in Shanghai

* Recueil des traveaux du Comité consullatif d'hygiène publique). M. Fauvel, rapporteur.

all governments are on an equal footing. In this connection the report remarks that "Chinese commerce is a power in itself, and holds in its hands a weapon which nothing in China can resist—*money*." It will not yield readily to quarantine restrictions.

Towards the end of 1873 a new regulation was drawn up, and published in English, French and Chinese. But even this Dr. Jamieson called "a pretense for quarantine, and injurious in consequence of the false security which it inspired."

With a brief statement of quarantine in Japan a moderately correct idea may be formed of the subject of quarantine in foreign countries, and the relations that European nations bear to this question in the East.

The report of M. Fauvel, dated February 9, 1874, says: "In Japan things have been done more regularly than in China. On the appearance of cholera in Bangkok and Singapore the Japanese Government, at the request of foreign residents, took measures to establish quarantines in all the ports of Japan." A mixed commission was appointed, charged with the direction of the quarantine service in each of the open ports. On this M. Durand-Fardel says: "I was very much astonished when, on asking for information on the subject from the different consular agents and legations in Jeddo and Yokohama, I was told that they did not know what I meant, for nothing of the kind existed in Japan. I was informed by M. de Saint-Quentin, chargé d'affaires, that when cholera appeared in Siam the Japanese Government showed some disposition to establish some means of protection. But it is well known that the Japanese inquire eagerly about European institutions, appear to be pleased with them, and pretend to adopt them, but they rarely carry these promises into effect. Their approval is only apparent, for it has happened more than once that they have shown more energy in suppressing measures adopted on the recommendation of Europeans, than they did in soliciting information. In fact, no attempt has yet been made to put the quarantine regulations in force."

The same writer concludes:

"The Sanitary Convention named in the first article has never met.

"The health officer referred to in the second article has not been appointed.

"No attempt has been made to establish quarantine regulations in any port in Japan, and the existence of such quarantine regulations is not generally known."

When countries, with a full knowledge of all the circumstances, and having little or no confidence in the possibility even of an agreement, will still, like Japan and some other governments, enter into a discussion of the subject, it must be either with the hope of prevailing by some means on all the other powers to adopt their views, or with the intention of entering the council with the determination to accept no proposition, but on returning home to pursue such a course as will seem to agree best with their private interests.

T. P. CORBALLY.

(To be continued.)

PROPOSED IMPROVEMENT OF THE MEDICAL AND SANITARY SERVICES ON BOARD TRANS-OCEANIC PASSENGER VESSELS: THE BILL BEFORE CONGRESS.

The following bill (H. R. 6179), introduced by Hon. H. W Slocum, of New York, March 24, 1884, read twice, referred to the Committee on Commerce, and ordered to be printed, was prepared by the committee appointed by the American Medical Association at the meeting in Cleveland in June last:*

* Dr. A. N. Bell offered the following resolution, which was adopted by the Association:

Resolved, That, being impressed with the truthfulness and importance of the Memorial of the Parliamentary Bills Committee of the British Medical Association, under date of March 17, 1883, the American Medical Association urges upon the Congress of the United States the subject of competent medical and sanitary service, and proper provision for its maintenance on board all trans-oceanic passenger vessels, and that a committee of five be appointed to promote this object, and to report upon the condition of the subject at the next session.

The committee consists of Dr. A. N. Bell, New York; Dr. A. L. Gihon, U. S. Navy; Dr. I. N. Quimby, New Jersey; Dr. H. O. Marcey, Massachusetts; and Dr. Henry H. Smith, Pennsylvania.

SUPPLEMENT TO AN ACT ENTITLED "AN ACT TO REGULATE THE CARRIAGE OF PASSENGERS BY SEA."

Be it enacted by the Senate and House of Representatives of the United States of America, in Congress Assembled:

SECTION 1. That in every steamship or other vessel carrying or bringing passengers, other than cabin passengers, *to the United States*, there shall be properly constructed and separated from other parts of the vessel two compartments or spaces to be used exclusively as hospitals—the one for the men and the other for the women; such hospitals to be located on the main deck or the deck immediately below it, and never *on any lower deck*, and to be in no case less in size than the proportion of eighteen clear superficial *square feet* for every fifty such passengers *and crew;* and such hospitals shall be supplied with proper beds, bedding and utensils, and kept so supplied throughout the voyage.

SECTION 2. And every steamship or other vessel carrying or bringing passengers, other than cabin passengers, exceeding with the crew fifty in number, and less than six hundred, shall be required to carry a duly qualified, competent and *regularly licensed* surgeon or medical practitioner, and where the number of such passengers and crew is over six hundred, a junior or assistant surgeon, or medical practitioner, in addition, which surgeons or medical practitioners, junior and senior, shall be rated as such on the ship's articles, and shall be provided with surgical instruments, medical comforts and medicines proper and necessary for diseases and injuries incident to a sea voyage, and for the proper medical treatment of such passengers and crew during the voyage, and with such articles of food and nourishment as may be proper and necessary for preserving the health of infants and young children; and the services of such surgeons or medical practitioners shall be promptly given without fee in every case of sickness, disease, or accident to any of the passengers or crew, or to any infant or young child of any such passenger who may require their services; and the medical officer, where there is but one, and the senior, where there are two, shall also be required to perform the duties of sanitary officers, to make daily inspections of all inhabitable portions of the vessel, and daily reports thereon in writing to the master of the steamship or passenger

vessel, together with such suggestions and recommendations as in his judgment may be necessary to the preservation of health on board. He shall also exercise constant vigilance in regard to the condition of the provisions and water, and promptly report to the master anything which may appear to him to be deleterious to the health of any person on board.

SECTION 3. For the proper exercise of these functions, and the maintenance of the respect to which such medical and sanitary officers are entitled, they shall be provided with a steward or apothecary competent to dispense medicines under their direction, and for their special service, and their tenure of office, remuneration, and right to suitable quarters, subsistence and attendance, shall be upon the same basis as, and co-ordinate with the purser, first officer and chief engineer of the vessel on which they serve.

SECTION 4. For a violation of either of these provisions, or the disregard of the recommendations *made in writing* by the medical and sanitary officers, as herein provided, the company to which the steamship or other passenger vessel belongs shall be liable to a penalty not exceeding two hundred and fifty dollars in every case.

SECTION 5. That this act shall take effect and be in force from and after its passage.

THE PROGRESS OF SANITATION AND DECREASE OF MORTALITY AS MEASURED BY VITAL STATISTICS.*

The statistics of a nation form the ledger by which it keeps account with itself as to all matters that relate to its solvency, its capital, its progress, its material resources and the condition of its constituency. "No inquiry can assume a scientific form unless it has a numerical basis to work upon." It is equally true that in order to study the social basis of a people in its most practical, social, educational and industrial interests, we

* Abstract of Introduction to the Report on Vital Statistics, by Ezra M. Hunt, M.D., S.C.D., Secretary of N. J. Board of Health, and Medical Superintendent of Vital Statistics. Seventh Annual Report of Board of Health of New Jersey, 1883.

must inform ourselves as to those conditions which the facts of figures can alone reveal. An English authority, recently speaking on this subject, says: "The question was taken up more and more enthusiastically by enlightened men, until at last the Government Statistical Department was formed, and that remarkable series of reports begun, which will immortalize the name of William Farr. * * * Those reports disclosed a state of things little dreamt of, and the statistical returns, compiled by Dr. Farr, showed how much the life and the health of the nation were dependent upon the conditions in which its individual members were placed."

Statistics which record the "movement of population" even excel in importance those as to (*a*) territory, (*b*) political, (*c*) agricultural, (*d*) industrial, (*e*) commercial and the intellectual, moral and religious condition. Quintelet has well expressed it when he says: "Population is the statistical element *par excellence;* it necessarily rules all the others, since it relates above all to the people and the appreciation of their welfare and their wants. * * * The other data have no real value, except so far as they relate to the number of the population. * * * The classification, according to age, allows of the establishment of tables of population, of forming correct ideas on mortality, on the forces at the disposal of the State in case of necessity, and of fixing the ratio between the useful fraction which contributes to the general well-being and the fraction which yet requires assistance and support to become in its time useful. The classification by professions indicates the means by which the population provides for its subsistence and tends to augment its prosperity; it allows the legislator more particularly to fix his attention on the principal wheels which work in the machine confided to his care. The classification by civil condition, by origin, by education, furnishes the administration with no less precious information to assure internal good order and to facilitate the execution of the laws. All questions which are connected with population deserve in general the greatest attention on the part of the government." This has come to be more and more recognized with each succeeding year. The school system which takes cognizance of all those between the ages of five and eighteen, looks after education not as a charity, but because this care of the popu-

lation is in the interests of the State. Even to make such a census more valuable we need to know how many are born and what proportion of these reach the age of five years, as well as what causes have been operative in reducing the vigor of those now about to enter on school life. If only the feeble died, there might be an incidental advantage in the preservation of a hardier stock. But unfortunately it is found that the infantile deaths are a measure of the enfeeblement of the surviving young population, so that a low sustained death-rate is the best guaranty for the survival of the fittest and the best assurance that those who do survive will be of such strength as to secure abundance for support. In such a land as this there is far more danger of limiting the means of subsistence by lack of vigor in the population than by lack of vigor in the soil or in the demands of productive industries.

The number of marriages is a very fair index of the general vigor and prosperity of the population. It is found that in hard times, or in times of national profligacy, there is always diminution in the number of marriages. Not less does the number of deaths indicate the vigor and prosperity of a country or the opposite. For, besides the actual losses of lives more or less valuable, these tell of a tax upon the comfort of families and of community, and upon their ability to secure a livelihood. It often happens that sickness and death paralyze the industries of a people, and are the severest burden of taxation imposed upon them. Where such a tax is avoidable, as is much of prevalent sickness, the State cannot be better employed than in preventing it. Every prudent attempt in this direction is an application of the principles of political economy. It is a lack of foresight not to make liberal provision to prevent disease, rather than to cause the liberality to depend upon some violent outbreak. What a great pestilence is to cities and States in its paralyzing and discouraging influence, that is sickness and death to each individual family. The marriage, birth and death-rates are found to bear such a proportion to each other, and to be such an index of real prosperity or its opposite, that the historical progress or decline of a nation may be traced thereby. The birth-rate does not become excessive where it is only the result of such a marriage-rate as results from announced, legitimate and open marriages. The mar-

riage-rate tends to a right proportion wherever the family and its preservation, care and prosperity are regarded as the defense of the State. The English reports show how "the marriage-rate reflects with much accuracy the condition of public welfare." Its fluctuations coincide in direction, though not in degree, with those which indicate the success or depression of agricultural, manufacturing or commercial industries. The death-rate has its definite bounds wherever the care of families is such as enforces a proper oversight of the conditions of life and reduces to the minimum the avoidable causes of disease. It is because such statistics afford the data by which we can study the causes that affect these vital conditions of population, that the significance of vital statistics has in the last half century been greatly augmented. Before this, the value of such records was known as bearing on rights of property; on determining questions of age, as of minority or military service, or pensions, and later in the great interests of life insurance. But it has become evident that such records are essential to those studies of life, of disease and of death, on which hinge the dearest interests of the citizens and of the State.

Spencer Wells well expresses it, when, in his recent Hunterian oration before the Royal College of Surgeons, he says: "The knowledge gained by the statistical work of Dr. Farr, and since carried on by Dr. Ogle, at the General Register Office, has led to sanitary legislation, and sanitary work has been followed by a lower general death-rate and smaller mortality in single forms of disease, and especially in those places —the great towns—where sanitation has been most active."

The value and importance of this study has never been more manifested than in the forty-fourth annual report (1881) of the Registrar-General of births, deaths and marriages in England, as just published (1883). The death-register in 1881 numbered 491,935. The death-rate was 18.9 per 1,000 living; the death-rate in the urban population, consisting of some fifteen and a half million persons, being 20.3, while that of the rural population, comprising some ten and a half million persons, was 16.8. This not only shows a gradual reduction of death-rate, but also how the greater attention paid to health matters in cities, and the great powers given by the English laws, aid to bring cities to an approximation to the health of rural districts.

In some of our own cities the death-rate is nearly double that of the healthiest country districts. Thus the total death-rate of Hunterdon county last year was 14.77 per 1,000, while that of the cities of over 5,000 inhabitants in Hudson county was 29.994 per 1,000.

The remarks of the Registrar-General are so illustrative, and bear so much on the relations of sanitary practice and of statistics to health, that they are here quoted: "There is nothing in the series of annual reports issued by this office that comes out more distinctly and unmistakably than the wonderful effect which the sanitary operations of the last decade have had in saving life. The public health act came into operation in 1872. The average annual death-rate for the immediately preceding ten years (1862–71) had been 22.6, and there were no indications whatsoever of any tendency of the rate to fall lower. Indeed, in 1871, the final year of this period, the rate was exactly the average, viz., 22.6. The act came into force; and at once the rate began to fall, and continued to fall year by year with almost unbroken regularity, until in 1881 it was, as above stated, no more than 18.9. Once only in the ten years that had elapsed since the act came into operation was the rate as high as the average of the previous decade. That was in 1875, when the rate was 22.7. In that year a second public health act, of more stringent character, came into operation; and from that date down to 1881 the death-rate did not once reach 22.0, and averaged no more than 20.5.

"Had the fall in the death-rate been limited to a single year, or to two years, or even to three, it might have been argued by skeptical persons that the improvement was due to a succession of seasons favorable to health, or to other causes unconnected with sanitary administration, and that the setting-in of the fall coincidently with the coming into operation of public health measures was no more than casual; but in face of a fall, lasting for ten years in succession and increasing each year in amount, no one can seriously maintain such a position. There can be no real doubt that the saving effected in life was the direct product of the money and labor expended in sanitary improvements. Doubtless the money thus expended was enormous in amount; and it will be well, therefore, to consider what return it has brought in."

"Now we shall probably be well within the mark if we assume that for every fatal case of illness there are from four to five more cases which end in recovery. This is about the proportion in enteric fever, which is a more fatal disease than the average of diseases. The result, therefore, on this assumption would be that, speaking in round numbers, there were 500,000 fewer cases of illness, and 92,000 fewer deaths in England and Wales in 1881 than would have been the case had the population been living under the conditions that existed in 1862–71. It may perhaps be objected, and not unreasonably, that the year 1881, with its extraordinarily low death-rate, was so exceptional that it can hardly be taken as a fair sample by which to measure the annual return in life and health from the money spent in sanitary improvements. Let us then take the entire period of ten years that elapsed between the first public health act and the close of 1881. Had the death-rate remained during that period at its mean level in the preceding decade, the total deaths from 1872 to 1881, inclusively, would have been 5,548,116, whereas they were actually no more than 5,155,367. Thus no less than 392,749 persons who, under the old regime, would have died, were, as a matter of fact, still living at the close of 1881.* Add to these saved lives the avoidance of at least four times as many attacks of non-fatal illness, and we have the total profits as yet received from our sanitary expenditure. Moreover, it is important to note that these profits were not equally spread over the ten years, but that there was a manifest tendency to progressive increase throughout the period. This is what might be anticipated, for the full effect of sanitary improvements requires time for development."

So far as this State is concerned, it was among the earliest to make an attempt to secure such statistics. However faulty the methods, there was still some advantage in the attempt. The Legislature, in 1878, adopted the present method of collection and record. It has been so far successful, as that the returns furnished will in accuracy and extent compare favorably with any in this country. There is an effort to fulfill the law on the part of those concerned, with the rarest exceptions. The faithfulness of assessors and city clerks is greatly to be commended. The returns of births are below the standard in cities, and it may yet become necessary to make the law as to these more stringent. Such cities as Paterson and Orange

* The mean birth-rates in the two decades, 1862–71 and 1872–81, were almost exactly the same, so that no correction need be made in this case.

show how fully and accurately returns can be secured. As it is possible from the cities and townships in which the returns are more accurate, and from the death-rate under one year of age, to allow for the deficits, so far as comparisons are concerned and deductions are made, the omission is not as disturbing as would at first sight appear. For if we have a sufficient number of actual returns from which to make large generalizations, the omitted events, which belong to exactly the same species of record, in their differences so balance and modify each other that by mathematical formulas "they may be considered as being numerically in the same ratio as the observed (or recorded) events to which they refer."

In the conduct of the Bureau of Vital Statistics it has been the effort of the Board of Health and the medical superintendent to secure those facts, and only those facts, which the ablest authorities on the subject, both in this and other countries, have regarded as essential for record and preservation. The next effort has been to file them in such manner and to record them in such order as shall make them most readily available either for puposes of legal, or social, or medical, or sanitary reference. We were so fortunate as to adopt a system and to place the clerical work in such competent hands as has well accomplished this purpose. The result of the medical oversight of the system is to give an order of return, such as shall render the events recorded comparable, and to see to it that the returns are so arranged as shall enable us more especially to determine the causes of diseases and death. It can also be said that to physicians these returns have an educational and clinical value, as they lead to a closer study of the nomenclature of disease, and so to its diagnosis. This always leads to better treatment and to closer watchfulness over all the events of sickness. This has led also to a great extension of inquiry into the preventable causes of disease, and has been one of the influences in aiding those who have special relations to disease. For it is to be acknowledged that until recently most physicians had not come to estimate either the value or importance of that part of education and observation which should accurately acquaint them with the physical surroundings affecting their patients, and with the bearing which these had upon invalidity or death.

As to how far the statistics thus secured should be tabulated and deductions made therefrom and printed as statistical tables, there are some limitations. Some of the facts are only valuable to reason from after there has been a very large accumulation in numbers.

While the continuous observation of close observers is always valuable, the value is greatly enhanced if facts have been recorded at the time. The effort, therefore, of this department has been, first of all, to put on record such facts as to the vital movements of population as are deemed important to be accessible for calculations and determinations which social science and political economy have declared to be desirable, and, next, to select from these for study such facts as have the most direct bearing on the welfare of the people.

As to marriages, it is desirable to know what has been the number of them, what the nationality, and what the occupations of the husbands, and how far residence in city or country seems to modify the marriage-rate.

As to births, the name, place and date of births, are matters of identification, and need only the record, and do not need full tables to be printed therefrom. But the parentage of the children, and the number of children as betokening the average size of families, and the number who have previously died, give some important indication as well as the average birth-rate as compared with the death-rate.

Still-births not only are something of a measure of the vigor of population, but point us often to certain social conditions that have to do with the limitations of life. While the act of causing abortion comes under the criminal code and not under law, it is found that a watchfulness over premature and still-births is not less in the interests of private and public morality than an important record of the vital or devitalizing causes of such brief life. It has been asserted by leading medical practitioners in the State that the requirement of a birth certificate has diminished criminal secrecy, and deters those unfitted for complicated cases from venturing so far to imperil the life of mother and child. The loss of mothers and enforced orphanage always means peril to the State in the direction of thriftlessness, pauperism and crime.

SANITARY COUNCIL OF THE MISSISSIPPI VALLEY.

The Sixth Annual Meeting of the Council was held in Memphis, Tenn., March 21, 1884. The following named delegates were in attendance :

C. W. Purdy, Chicago; W. H. Doak, Martinsville, Ill.; E. A. Millioner, Springfield, Ill.; C. Y. F. Meriwether, Oakland, Miss.; G. W. Trimble, Grenada, Miss.; T. S. Elder, Secretary New Orleans (La.) Auxiliary Sanitary Association; J. M. Hall, Medical Inspector, Chicago, Ill.; L. H. Montgomery, Secretary Chicago Medical Society; E. B. Montgomery, Quincy, Ill. ; E. Garratt, Medical Inspector, Chicago, Ill.; B. M. Griffith, Board of Health, Springfield, Ill.; G. B. Thornton, President Memphis Board of Health; Dr. J. H. Rauch, Chicago, Ill., Secretary Sanitary Council Mississippi Valley; Dr. Starkweather, Chicago, Ill.; Dr. J. H. Lenow, Little Rock Board of Health; J. A. Dibbrell, Jr., Little Rock, Secretary State Board of Health of Arkansas ; J. C. Hearne, Secretary Missouri State Board of Health, Hannibal; C. N Hewitt, Secretary State Board of Health, Minnesota; H. B. Baker, Secretary State Board of Health, Lansing, Mich.; J. B. Lindsley, Nashville, Tenn., Treasurer American Public Health Association; G. W. Overall, Memphis; Dr. C. C. Fite, Secretary Tennessee State Board of Health, Nashville; Dr. T. G. Birchett, Mayor of Vicksburg; Dr. L. F. Solomon, New Orleans Medical and Surgical Association; E. H. Kimbrough, Danville, Ill.; D. P. Hadden, Memphis; Dr. B. T. Buckley, Freeport, Ill.; Dr. D. W. Hand, State Board of Health, St. Paul, Minn.; Dr. W. E. Cowan, health officer, Galesburg, Ill.

The meeting was called to order by the Hon. D. P. Hadden, of Memphis, who spoke as follows : " It affords me great pleasure, gentlemen, to welcome each and every one of you to this city. We know you come in the interest of sanitation generally. The city feels the greatest interest in all matters of sanitation, and every man, woman and child extends to you a hearty greeting. It is always a pleasure to us to have an

organization of this character meet in our city. This association has no money to sustain it, yet its influence has been felt in every city of the valley. I know of no other organization which, without pay, meets together simply for such purposes, or that has the prestige this body has. We can truly say that no city in the Union has derived so much benefit from it as Memphis. I might dilate for hours to show our appreciation, but it would be useless, as the newspapers have given you the facts from month to month and year to year. They have informed the public of the manner in which it has relieved us from sickness and distress, and from depression of spirits. They have told you of a city redeemed—one from which people no longer fly, but to which thousands have come and are coming. You did me the honor at your last meeting at Jackson, Miss., to elect me the Vice-President of the Council, and it is in this capacity that I have called you together, in the absence of President Wirt Johnson, who, I am informed by telegram, cannot attend on account of sickness. But as my time is so much occupied with the affairs of the city I cannot give that close attention to the meeting that I desire to do, and therefore ask that you appoint some one who can give his time wholly to you, to preside over your deliberations." Dr. G. B. Thornton was accordingly made President *pro tem.*, to act in President Hadden's place.

On motion of Dr. Rauch, all those present who represented health organizations and medical associations were elected members of the Council.

After brief attention to some routine business, the specially important paper of the session was called for—the report of the Secretary, Dr. John H. Rauch, as follows :

At the last meeting of the Sanitary Council of the Mississippi Valley, at Jackson, Miss., April 3 and 4, 1883, the following resolutions were adopted :

Resolved, That in case the National Board of Health is deprived of the power of making inspections of persons and freight when demanded by the local Boards of Health, certificates issued under the supervision of a representative or representatives of the Sanitary Council of the Mississippi Valley shall be accepted as valid by the Boards of Health of the Mississippi Valley, provided that said inspections be carried on

under the rules and regulations heretofore prescribed by the National Board of Health.

Resolved, That the Sanitary Council recommends that the States of the valley make voluntary contributions, to be expended under the direction of the Executive Committee of the Council, to continue river and rail inspections, in the event that no funds are placed in the hands of the National Board of Health for that purpose.

Having received notice from the Secretary of the National Board of Health that that body would be unable to continue inspections after June 30th, a meeting of the Executive Committee was held at Memphis on the 21st of June, at which the following proceedings were had:

At a meeting of the Executive Committee of the Sanitary Council of the Mississippi Valley, held at Memphis on the 21st day of June, 1883, the following members were in attendance: Dr. Wirt Johnson, of Mississippi, President; David P. Hadden, of Memphis, Vice-President; Dr. John H. Rauch, of Illinois, Secretary. Dr. G. B. Thornton, President of the Memphis Board of Health and member of the Tennessee State Board, was also present by invitation. After thoroughly canvassing the situation, which up to this date was considered altogether encouraging, the following preamble and resolutions were adopted:

Whereas, The inspection service now conducted by the National Board of Health in the Mississippi Valley will cease on the 30th day of June, on account of want of funds for its further maintenance; and, *whereas*, the commercial welfare, no less than the health interests of the valley, demands that these precautions be continued during the summer months; therefore, be it

Resolved, That the supervision of this service from and after June 30th be assumed by the Sanitary Council of the Mississippi Valley, in accordance with the action of the Council had at its fifth annual meeting, in the city of Jackson, Miss., April 3 and 4, 1883.

Resolved, That the inspection station now maintained by the National Board of Health below Memphis be continued at the expense of the Taxing District government of Memphis.

Resolved, That the Mississippi State Board of Health should

establish and maintain an inspection station on the Mississippi River at some point between Vicksburg and the Louisiana State line.

Resolved, That the present corps of inspectors of the National Board of Health on duty at the Mississippi River quarantine station below New Orleans and on the river and railroads at New Orleans be continued under direction of the Executive Committee from and after June 30th.

Resolved, That the rules and regulations of the National Board of Health, for the conduct of this inspection service, be, and the same are hereby adopted for its further continuance under the direction of the Sanitary Council.

Resolved, That the supervision of this service, on behalf of the Executive Committee, be assigned to the Secretary of the Council, Dr. John H. Rauch, Springfield, Ill., to whom all reports of inspectors and communications pertaining to the service should be addressed.

It was further agreed that on and after July 1st only the certificates given by the inspectors of the Sanitary Council of the Mississippi Valley would be recognized by the inspection stations along the river, and by the health authorities of the towns and cities in those States which are members of the Council.

The meeting adjourned subject to the call of the Secretary, who at once proceeded to New Orleans for the purpose of personally arranging the details of the service at that important point.

On July 1, 1883, in pursuance of the action above recited, the Sanitary Council of the Mississippi Valley assumed supervision of the river inspection service, which was thenceforth continued uninterruptedly under such supervision up to September 15th, when, all danger of yellow fever infection having passed, it was discontinued for the season.

During this period an inspector was maintained at the Mississippi river quarantine station below New Orleans, and two rail and two river inspectors at the port of New Orleans. In addition to these Mississippi maintained a station at Fort Adams, and Memphis one on President's Island. In the operation of the service the rules and regulations of the National Board of Health were continued, no changes being made either

in the *personnel* of the service or in its policy, by the Council, after assuming supervision. The inspector at the quarantine station below New Orleans was relieved from duty on July 31st, owing to the action of Gov. McEnery, as hereinafter detailed.

At the request of the Executive Committee the expenses of the maintenance of the service, under the supervision of the Council, were defrayed directly by those interested, so that the Council was relieved of the responsibility and labor attaching to the disbursement of money. Mississippi, through its State Board of Health, and the Taxing District of Shelby county, through the Memphis Board of Health, paid the expenses of the stations at Fort Adams and President's Island respectively. The Illinois Central and Louisville and Nashville railroads paid their own inspectors in New Orleans; while the river inspectors in New Orleans were paid by the commercial and steamboat interests through the New Orleans Auxiliary Sanitary Association.

No officer or member of the Sanitary Council received any compensation for his services in connection with this work.

From May 15th, the beginning of the quarantine season, up to the close of July, there had arrived at the Mississippi river quarantine station, below New Orleans, seventy-three vessels from foreign ports. Of these, forty-seven were inspected up to June 30th, under the supervision of the National Board of Health, and during July the remaining twenty-six were inspected under the supervision of the Sanitary Council.

Of these latter, eleven were from ports infected by yellow fever at the date of departure, and three of them—namely, the Berna, July 8th; the Merchant, July 16th, and the Buteshire, July 17th, arrived with cases of yellow fever on board. Among the remaining vessels one was found to have had yellow fever on board in Havana last season, and in seven other cases it was probable that they had been infected at some previous time.

The sanitary condition of the vessel, cargo, crew and passengers in twelve cases was good, and in the remaining vessels —with the exception of the Berna, Merchant and Buteshire, which were infected—the report of the inspector was qualified. In all cases the vessels were subjected by the quarantine au-

thorities to a thorough general cleansing, purification of bilge, hold, etc., and disinfection with carbolic acid and copperas, and the cargoes were fumigated with sulphurous-acid gas. Coffee-ships from Rio de Janeiro were either not allowed to proceed up to New Orleans at all, or only after removal of cargo and thorough fumigation of the same.

The arrival of the Merchant, July 16th, and of the Buteshire the following day, both from Vera Cruz with yellow fever cases, led the Governor of Louisiana, July 20th, to recommend to the Louisiana State .Board of Health that no infected vessels be permitted to enter the Mississippi River, and that all infected vessels then at the quarantine station be removed out of the river at once, assigning the reason that their presence at that point had practically rendered the station an infected port in dangerous proximity to New Orleans, and threatened a stupendous calamity to the Mississippi Valley. At its meeting, July 23d, the Board discussed this communication, and finally adopted a resolution requesting the Governor to issue a proclamation enforcing his recommendations and declaring non-intercourse between Louisiana and Vera Cruz, Rio de Janeiro, Havana and other infected ports, which proclamation was made the following day, July 24th. The infected vessels were ordered to be removed from the river, and for the first time in a number of years the lower Mississippi was freed from the menace arising from the admission of yellow fever ships to the river.

Immediately upon receipt of information of this action, the request, previously preferred to Gov. McEnery, to permit the Sanitary Council Inspector to remain at the quarantine station, was withdrawn by telegram, and the inspector was relieved from duty July 31st.

In this connection it is proper to remark that while both the National Board of Health and the Sanitary Council have been advocating for the last four years the exclusion of infected vessels from the Mississippi during the dangerous season, and the use of Ship Island as a refuge station for such vessels, the necessity for absolute non-intercourse has not been recognized. The plan proposed by these two bodies contemplated the maintenance of an inspection station at or near Port Eads. All vessels entering the river would here be subjected to a rigid

examination. Those found to be infected would be compelled to go to the Ship Island refuge station; healthy vessels from infected ports would be subjected to such treatment as would render it safe to allow them access to New Orleans; while all others, if found in a good sanitary condition, would be passed without detention. In this way it was believed the public health could be properly protected without inflicting any serious injury to the commercial interests of New Orleans.

On August 13th, immediately after my return to Springfield from New Orleans, I recommended that, "unless yellow fever should appear in that city by the 20th instant, inspections should cease on the 31st." Doubts as to the character of the Jackson, Miss., sickness, and the conditions at Pensacola and vicinity, prevented the adoption of this suggestion; but on the 15th of September, New Orleans and the valley remaining free from any suspicious illness, the service was definitely suspended for the season.

From May 15th to September 15th, during which period the service was maintained, there were inspected seventy-three ocean vessels at the Mississippi River quarantine station; 277 steamboats and other craft at the port of New Orleans; 439 steamboats and other craft at the stations of Fort Adams, Miss., and President's Island, Tenn., and 1,421 freight trains on the Illinois Central and Louisville and Nashville Railroads at New Orleans. The aggregate inspections comprise 2,210 ocean vessels, river craft and freight trains, with a capacity of 2,534,870 tons, and carrying 39,947 officers, crew and passengers.

Not for many years has New Orleans been so free from alarm or cause of alarm during the corresponding months, as during the sixty days ending August 31st last, and there was practically no trouble with regard to the yellow fever during the summer in any portion of the region in which the Sanitary Council is directly interested.

In conclusion, it seems proper to add that the utility of the Council has been again demonstrated —this time in the direction of practical administration over a large area, embracing many and diverse interests, and co-ordinating and utilizing agencies and authorities which otherwise would have been limited in their usefulness to their own individual fields. The methods of inspection and sanitary supervision were uniform along

thousands of miles of rail and river; and all conflict of authority, all clashing of boards, and all expense and irritation of ill-advised and unnecessary quarantine, and, hence, all embarrassment and interruption of travel and traffic, were successfully and happily avoided.

There is no question in my mind but that the form of the organization should be maintained in readiness for instant action whenever an emergency arises similar to that with which we were confronted during the summer of 1883.

The minutes of the last annual meeting—that at Jackson, Miss., April 3 and 4, 1883—have been published in full, and copies supplied to the delegates; so that, unless called for, there is no necessity for reading these at this time.

After the reading of the Secretary's report, the Committee on Resolutions reported the following:

Whereas, The Supervising Surgeon-General of the United States Marine Hospital Service has opposed, and in a manner defeated, important measures for the promotion of public health interests in the United States, which have been advocated by our leading sanitarians and by this and other sanitary organizations in this country; and *whereas*, the representatives of the Marine Hospital Service in the National Board of Health have not contributed to the success of the important work of that board; therefore

Resolved, That in any associated action which we may contemplate, either as executive sanitary officers or as voluntary associations, it behooves us to consider the Marine Hospital Bureau as inimical to the public health interests, which it is our duty to protect, and as a danger which we should not disregard. For, although neither the chief of the service nor his subordinate officers are known in sanitary organizations like this, they are able to so place themselves before Congress as to secure the ends they have in view.

Resolved, That as delegates representing the health organizations in the several States and municipalities hereinafter mentioned, and collectively, as the Sanitary Council of the Mississippi Valley, we earnestly memorialize Congress to so amend the act establishing the National Board of Health as to dispense with the representative in that board from the Marine Hospital Service.

Be it further resolved, That the Sanitary Council of the Mississippi Valley recommends to Congress the adoption of the bill introduced into the House of Representatives Jan. 8, 1884, by the Hon. Mr. Young, providing for the prevention of the introduction of infectious diseases into the United States, for obtaining information of the sanitary condition of foreign ports and places in the United States, and for procuring information relating to climatic and other conditions affecting public health.

This report elicited an animated discussion. It was finally tabled by a close vote, and the following was adopted as a substitute:

Resolved, That the Sanitary Council of the Mississippi Valley, in annual session assembled, memorialize Congress to adopt the bill introduced into the House of Representatives January 8, 1884, by the Hon. Casey Young, providing for the prevention and introduction of infectious diseases into the United States, and for obtaining information of the sanitary condition of foreign ports and places in the United States, and for procuring information relating to climatic and other conditions affecting the public health.*

The following resolution was also adopted by a unanimous vote:

Resolved, That the thanks of this Council be, and the same are, hereby tendered to Dr. Rauch, the Secretary of the Council, for his arduous and faithful labors, under the instructions of this Council in 1883, and the Executive Committee are hereby instructed, if necessary, to adopt the same line of action in regard to the prevention of the introduction of yellow fever or other infectious diseases into the Mississippi Valley during the year 1884.

The Council next proceeded to the election of officers for the ensuing year, with the following result: Hon. D. P. Hadden, of Tennessee, President; Dr. J. A. Dibbrell, of Arkansas, Vice-President. The Secretary, Dr. Rauch, has another year to serve —greatly to the gratification of all persons interested in the work of this useful association.

Thanks were voted to the railroads in communication, the Peabody Hotel, and the newspapers of Memphis, for courtesies to the delegates; and, after a happy address by President Had-

*The bill referred to is the one published in THE SANITARIAN for March, p. 260.

den, expressive of his gratification in behalf of the people of Memphis and others interested in the good work accomplished, the Council adjourned.

THE LONDON SEWERAGE QUESTION.

A recent number of the *Contract Journal* (London) says that London, with the most remarkable sewerage system in the world, is still in trouble as regards the disposal of sewage.

"Twenty-three million cubic feet of sewage are daily poured into the Thames, but the tides bring a great deal of this matter back to within a short distance of London Bridge. It is estimated that of the 446 tons discharged per minute by the numerous sewers, an amount equal to 1,250,000 tons per year is mud, which enters the river mainly from the Barking and Crossness sewers. Much of this solid matter is harmless, beyond the silting up of the river bed; but it also contains much objectionable matter that had better be further removed from the city.

"The Royal Commission, appointed in 1882 to look into this question, have made their first report; and, while they praise the system of drainage works carried out under the direction of Sir Joseph Bazalgette, admit that the London sewage is having a serious effect on the purity of the lower Thames and its tidal banks.

"The committee can as yet suggest no remedy, except that in their opinion material advantage would be gained by carrying the sewage still further down the river. The original design was to discharge the sewage only on the ebb tide, but the vast increase in quantity has made it necessary to break this rule. Larger reservoirs, to cost $800,000, have been planned, but they promise to only partially relieve the evil. The one great objection to extending the outfall system is the pumpage that would thus become obligatory to obtain the required flow.

"The engineers, Mansergh and Melliss, called in to consult with the joint board of the Lower Thames Valley District, propose chemical precipitations at Mortlake, Hampose, or Barnes; but landowners object, and a double drainage system would be required, separating the storm-water from the sewage. The quantity to be dealt with—446 tons per minute—is the great obstacle; and, as finally reported, the whole question is at deadlock again, with no feasible way out of the scrape."

EDITOR'S TABLE.

A REPRESENTATIVE COUNCIL OF STATE BOARDS OF HEALTH.

The scheme for a closer union of the State Boards of Health, inaugurated by Dr. J. N. McCormack, Secretary of the State Board of Health of Kentucky, and to be considered during the session of the American Medical Association at Washington, is very heartily endorsed by Dr. Gihon, the President of the American Public Health Association, who suggests a plan by which this can be accomplished without the necessity of establishing an independent organization. He advocates the creation of a Standing Committee or Section of the A. P. H. A., to be entitled "The Representative Council of State Boards of Health," and "to consist of the President and Secretary of each State Board of Health and of the National Board of Health, or of two other members from each of these Boards, selected as their representatives, to whom shall be referred all questions concerning State Boards, their provinces and powers, and who shall present to the Association, and under its authority to the public, such recommendations as the majority may deem advisable, and all votes in said Council shall be by States, each State having a Central Board of Health, and the National Board of Health being entitled to one vote.

Where there is no State Board of Health, the President and Secretary, or members representing them, of the Boards of Health of the capital or chief city of the State, Territory or District shall be admitted to the Representative Council and take part in its deliberations, but they shall have no vote."

A similar measure was proposed at the meeting of the A. P. H. A. at Richmond, Va., November 22, 1878, by Dr. Stephen Smith, in the shape of a constitutional amendment, creating "a Council to consist of the President, Vice-President, Secretary and Treasurer, and of one member from each State Board of Health, as appointed by said Boards, and of an equal number of members to be elected by the Association, and a representative from the Medical Services of the Army, of the Navy, and of the Marine Hospital Service," which "Council shall at each

annual meeting make to the Executive Committee any recommendations it may deem proper. It shall also obtain such reports from State Boards of Health, and from States not having Boards, as shall secure the objects of the Association."

The present Advisory Council, composed of a representative from each State and from the several national services, has appropriated many of the features of Dr. Smith's amendment. Dr. Gihon's plan has the advantage of excluding all but representatives from Health Boards, who can discuss their own affairs with the utmost latitude and independence.

The establishment of a Representative Committee of this sort is all the more necessary since the State-Medicine Section of the American Medical Association seems to have become honorary only: not one of the elected members of that section—representing the several States—having been communicated with in any way during the past year by the Chairman or Secretary. Whether this neglect of the Section on State Medicine of the American Medical Association, by members of that body, elected to the section with special reference to their supposed interest in it, is due to a growing apathy on the subject in that connection, or to a deference to the more potential work of the American Public Health Association, possibly admits of question. However this may be, it is clear to our mind that the interests of the State Boards of Health can certainly be more effectually promoted with the co-operation and under the auspices of the American Public Health Association, than they can possibly be without it, or by any other association that now exists, or to any that has been suggested.

LOUISIANA.—The State Board of Health met and re-organized April 12. The members of the old board holding over into the new are Drs. Felix Formento, L. H. Von Gohren, J. C. Faget and Charles E. Kells. The new members are Messrs. W. M. Smallwood and Joseph A. Shakspeare, and Drs. Joseph Holt, L. F. Salomon and S. R. Olliphant. All the members were present except Dr. Formento.

Dr. Joseph Holt was elected President, and Dr. S. S. Herrick was re-elected Secretary and Treasurer.

Resolutions were adopted as follows:

Resolved, That it is the fixed and irrevocable purpose of this

board to apply quarantine restrictions against all ports where contagious or infectious diseases exist to the limit of the law; and, if necessary, it will advise the total suspension of all communications with such ports while so infected.

Resolved, That while we are guarding with sleepless vigilance the outlets of the Mississippi River, we are not unmindful of the dangers that threaten us from the rear. In more than one instance yellow fever has been introduced into this city and State through the States of Texas and Mississippi. All things considered, the least protected sections are the long lines of seacoast westward in Texas and eastward in the States of Mississippi, Alabama and Florida. The approaches from without to this State are through Lake Borgne, the Mississippi River and Berwick's Bay; those we will guard with sleepless vigilance, and while we are doing that, we call upon the authorities of the States of Texas, Mississippi, Alabama and Florida to exercise a like effective control over the seacoast in those States.

Resolved, That while this board will maintain its just prerogatives as a department of the State Government, it invokes the co-operation and confidence of any and all organizations at home and abroad that may be laboring to promote or protect the public health.

Resolved, That, recognizing the great importance of securing the co-operation of the Boards of Health of other States, and of other health associations wherever situated, and of establishing a condition of absolute confidence, it is hereby made the duty of the President and other officers of this board to extend to Boards of Health of other States, and other health associations, unrestricted access to the records and health reports of this board, as well at the several quarantine stations as at the central office of this board in New Orleans; and it is hereby further made the duty of the President of this board to make public from day to day, as may be necessary, the condition of the public health, and he is hereby specially required, in the event yellow fever should be introduced into this city or State, to communicate such fact without delay to the exchanges and commercial bodies in New Orleans, and to the Boards of Health of other cities and States.

Resolved, That the co-operation of the several exchanges and commercial bodies of this city is earnestly solicited in the sanitary work of this board, and in the proper, intelligent and effective application of the sanitary and quarantine laws of this State.

Resolved, That while tendering to other boards and health associations generally, at home and abroad, the courtesies and confidence of this State Board of Health, we solicit the like consideration of the boards of health and health associations

of other States, to the end that confidence may not only be reciprocal, but established on a firm and enduring basis.

Resolved, That having thus declared our purposes and the policy of this board, it is expected that no credence will be given, at home or abroad, to any reports respecting the state of the public health in this city or State, that are not sanctioned or verified by the action of this board, or of its duly appointed officers.

Resolved, That in order to preserve the good name and fame of this board, it is impolitic to appoint any person an inspector who is the business or professional partner of a member of this board, or of any person with whom any member of this board is or may be interested in the services to be performed by such appointee.

THE EXECUTIVE COMMITTEE OF THE AUXILIARY SANITARY ASSOCIATION, at its regular weekly meeting, April 17, on motion of Dr. Stanford E. Chaillé, adopted the following:

Whereas, The New Orleans Auxiliary Sanitary Association has always desired and advocated cordial co-operation with all sanitary organizations, without as well as within this city, and continues especially anxious to be a hearty and efficient auxiliary to the Board of Health of the State of Louisiana;

Resolved, That this association emphatically endorses and will vigorously maintain the wise policy foreshadowed in the various resolutions adopted on April 12, 1884, at the first meeting of the reorganized Board of Health, and that the members of this association earnestly appeal to their fellow citizens to contribute liberally the means requisite to enable them to give to the State Board, which is inadequately supplied with funds by the public treasury, the efficient aid indispensable to protect the health of this city ; and,

Whereas, The execution of any policy is apt to give rise to honest differences of opinion and to unfriendly misunderstandings:

Resolved, That all members and officers of the State Board are invited to be present at the meetings of this association, and that the President of the State Board, or any member delegated by said board, is solicited to exercise in future the right, hereby given, to explain in person at any meeting of this association any matter which concerns the sanitary welfare of this city, and especially any such matter as may cause or may have caused a difference of opinion and thereby a failure of cordial co-operation.

Resolved, That an official copy of the above be sent to the Board of Health.

QUARANTINE PROCLAMATION.

EXECUTIVE DEPARTMENT,
State of Louisiana.

Whereas, section 3049 of the Revised Statutes of this State provides "that the Governor shall issue his proclamation, upon the advice of the Board of Health, declaring any place where there shall be reason to believe a pestilentious, contagious or infectious disease exists, to be an infected place, stating the number of days a quarantine is to be performed by the vessels, their passengers, officers, crews and cargoes coming from such place or places;"

Now, in pursuance of the provisions of the statute aforesaid, and pursuant to a resolution of the Board of Health of the State of Louisiana, recommending and advising the same, adopted at a meeting held in the city of New Orleans, on the 14th day of April, A. D. 1884, I have thought proper to issue this, my proclamation, establishing a quarantine to take effect from and after the 1st day of May, A. D. 1884, with the following specifications, to wit:

All vessels, together with their crews, passengers and cargoes, arriving at the several quarantine stations of the State from the Mexican ports of Matamoras, Tampico, Tuxpan, Vera Cruz and Minatitlan, and from the port of Colon, Central America; from all ports on the Islands of Cuba, Hayti or San Domingo, Porto Rico and Jamaica; from the Brazilian ports Rio de Janeiro, Bahia and Pernambuco, as well as from all places and towns contiguous and adjacent to said ports, and between which and said ports unrestricted intercourse is allowed and no rigid quarantine enforced, to be detained TEN FULL DAYS, and vessels and cargoes to undergo cleansing and disinfection.

Also, that vessels from other West Indian Islands, and from ports along the Isthmus of Panama and the coast of South America as far south as Brazil, be subjected to inspection and such cleansing, disinfection and detention as the Board of Health may direct, particular reference being had to the Islands of Barbadoes, St. Thomas, Martinique, Guadaloupe and Trinidad, and to the ports of Carthagena, Baranquilla, Laguayra, Georgetown, Cayenne, Paramarelos and all places contiguous and adjacent to said ports, and between which and said ports unrestricted intercourse is allowed and no rigid quarantine is enforced.

And I do hereby direct the proper officers at the several quarantine stations to rigidly enforce the execution of this proclamation, and any violation of its provisions and of the laws of this State on the subject matter to be vigorously prosecuted.

In testimony whereof I have hereunto set my hand and caused the seal of the State of Louisiana to be affixed at the city of Baton Rouge, this sixteenth day of April, in the year of our Lord one thousand eight hundred and eighty-four, and the one hundred and eighth of the Independence of the United States.

By the Governor: S. D. MCENERY.

OSCAR ARROYO, *Assistant Secretary of State.*

MARYLAND.—The Fifth Biennial Report of the State Board of Health, 1883, pp. 275, devotes thirty-one pages to a succinct report on the condition of the various State institutions subject to its surveillance, the effects of malaria on industrial interests, drainage, sewerage, and increased public interest in practical sanitation. Next follows a report of the proceedings of the State Sanitary Convention, held in Baltimore in November last, comprehending a number of papers of practical importance throughout the State; but most of all those on sewerage with reference to the city of Baltimore, in connection with the pecuniary costs of the unsanitary conditions—the thousands of cesspools and privy vaults poisoning the soil—are well shown by Drs. Jackson, Piper, and W. C. Van Bibber. And the papers on Sewerage by Major Latrobe and Col. Waring, and Drs. Chancellor and Bell, are full of important practical suggestions for getting rid of the abominable and death-dealing filth receptacles which disgrace—but for these—one of the finest cities in the world.

The report on vital statistics shows the usual inadequacy of State appropriations for this purpose, with the usual result—very incomplete returns. For Baltimore, in 1882: Population by U. S. Census of 1880—white, 278,487; colored, 33,703—332,190; and the same, as estimated by police census middle of May, 1882: White, 348,300; colored, 59,620—408,520. Marriages reported, 3,634; births (including 677 still births), 8,436. Deaths—white, 6,878; colored, 2,045—8,923. Death rate per 1,000 (police census), 21.81; white, 19.70; colored, 34.00. Deaths of children under five years of age, 3,755—42.07 per cent. of the total number. Deaths from zymotic diseases, 2,802—31.40 per cent. of the total number. Deaths from small-pox, 551.

The report concludes with important and excellent rules for the arrest and prevention of contagious and infectious diseases.

MICHIGAN.—The annual meeting of the State Board of

Health was held at its office in Lansing, April 8, 1884.

The members present were President Avery, Drs. Lyster, Hazlewood, Vaughan, Tyler and Secretary Baker.

Reports of the sanitary condition of the Wayne County poorhouse and asylum, and of the Barry County jail, were made by the committees who examined these institutions, and these reports were ordered printed.

Dr. Vaughan read a paper prepared by Dr. C. P. Pengra, which gave results verifying the general impression that freezing does not render water pure.

The Secretary presented a summary compiled from lists of medical practitioners registered under the new law. The number of counties in the State is 80, from 76 of which reports have been received. The number of registrations returned is 3,285, but in some cases physicians are registered in two or more counties. The number reported to have graduated is 2,351; those who had attended some college but had not graduated, 208; those who had attended no college, 726. The number belonging to all schools, reported as having graduated, is 72 per cent. of the whole number; the non-graduated collegiates are 6 per cent., and the non-collegiates are 22 per cent. of the whole number. The "graduates" are from all classes of medical colleges, hospitals, medical societies, etc. The number of different "schools" of medicine reported in these sworn statements is about 75, including "Cureopathic," "Indian," etc. In at least one instance it is reported that the sworn statement had to be signed by a "mark," the practitioner being unable to write even his own name. The number registered as belonging to the four most prominent schools of medicine are as follows: Regular, 1,533; Homœopathic, 490; Allopathic, 398; Eclectic, 366. The proportion of graduates to practitioners is: Regular, 87 per cent.; Homœopathic, 74 per cent.; Allopathic, 81 per cent.; Eclectic, 47 per cent. (Of all schools, as above stated, the per cent. is 72.)

It was decided to print the names and addresses of the health officers in Michigan as soon as full returns are received. The number in the State is nearly 1,400.

The following resolutions were unanimously adopted:

Resolved, That this Michigan State Board of Health respectfully and earnestly memorializes Congress to pass the bill

introduced into the House of Representatives January 8, 1884, by the Hon. Casey Young, or of some similar bill, providing for the prevention of the introduction of infectious diseases into the United States, and for procuring information relating to climatic and other conditions affecting the public health.

Resolved, That we consider the National Board of Health the best existing and the proper agency to carry on the work mentioned in the preceding resolution.

The weekly reports for the month of March indicate for the first three an increase of influenza, pneumonia, whooping cough, rheumatism and intestinal inflammations, and a decrease of scarlet fever; and for the third week an increase also of intermittent and remittent fevers. For the fourth week, ending March 29, inflammation of the brain and pneumonia increased, and remittent fever, inflammation of the bowels, tonsilitis, and bronchitis decreased in area of prevalence.

The prevailing winds for the first week were from the Northwest, and as compared with the preceding week, the temperature lower, the absolute and the relative humidity and the day and night ozone were less. For the three following weeks the prevailing winds were from southeast to southwest, and as compared with the preceding week the temperature was considerably higher, the atmospheric pressure considerably lower, the absolute humidity and the night ozone more, the day ozone considerably more, and the relative humidity less.

NEW JERSEY.—The Seventh Annual Report of the State Board, for 1883, a pamphlet of nearly four hundred pages, records substantial progress in sanitation in several particulars. By increased public attention to the importance of pure water, drainage and sewerage, the danger of cesspools and unsanitary surroundings, alacrity with which the officers of public institutions adopt suggestions for sanitary improvement, attention to the healthfulness of the public schools on the part of officers and teachers, attention to the health of industrial trades in factories by the proprietors, and by the co-operative work of voluntary associations and "Health Counsels for Working People" throughout the State.

The report sets forth the duty of the Board: "To take cognizance of the interests of health and life among the citizens of the State; to make sanitary investigations and inquiries in

respect to the people; the causes of disease and epidemics, the sources of mortality, and the effects of localities, employments and circumstances on the public health, and to gather such information in respect to these matters as it may deem proper for diffusion among the people."

It is with some disappointment that, after reading this suggestive quotation, on turning to the important subject of—

"*Sanitary Inquiries as to Health Resorts*," there is evident need of more aggressive measures than the Board appears to have the power to exercise. The suggestions are such as to lead to the inference that the condition of the infamous fever nest near Seabright, where two guests contracted typhoid fever summer before last, were compelled by the proprietor to pay him $5,000, under threat of expulsion in the middle of the night, are not exceptional. That, indeed, these dangerous conditions are so common to the New Jersey Sea-coast Health Resorts as to implicate them all. A few are named in the report as having taken some action upon the suggestions of the health authorities for the improvement of the water supplies; and Atlantic City, in particular, is complimented for the sewerage works now in progress there, by which all the sewage is to be promptly removed and utilized, and that ere long all the hotels of that place will be connected with the system. But at

Long Branch, "one hotel has five successive cesspools of enormous proportions, and at the end a boarded and covered filth-bed of crudest construction. At one point, on account of smells, a charcoal-house is built over the cesspool to diminish the odor. The only relief was to find a common workman, who said he got up every morning before the boarders, in order to smell; and that he had but one rule, and that was somehow to correct all smells. His inventive genius in this direction was far more protective than anything we saw, and was the only thing that made the apparatus tolerable. In another hotel the closets were located over a worse cesspool, and the mode of delivery was the same." In "another," and "another," and so on, conditions indescribably filthy and dangerous are indicated, without the courage to particularize the houses and keepers—who should be indicted and punished.

Notwithstanding, this portion of the report concludes with

the statement that "Our knowledge of the various Boards of Health, of the public spirit of citizens, and our determination as a Board not to censure without discrimination, not to conceal, and only to boast where there is ground of security, leads us to feel confident that no health resorts will surpass these in prevision, and provision for the interests of patrons as well as for the welfare and success of residents"!

And, finally:

"But we have to say that visitors at such hotels, before taking rooms, should, at their own expense, have a sanitary expert of acknowledged skill and trustworthiness to make sanitary inspection in their behalf. We have already done something to correct grave errors, and to interrupt the policy of concealment. But if patrons will thus seek common protection they can insure what is their right, and aid in this beneficent life-preserving work. It is the intention of the State, through this Board, to insure to the tens of thousands that resort hither for health, protection from gross sanitary neglects. Not because such places here are any worse than those in other States, and not because Long Branch is not a salubrious and most desirable retreat, but because the self-satisfied carelessness or uninformed presumption of some wealthy owners of hotel property have made light of these defects, and they have been tardy in their correction."

"*Inquiries into the Condition of Charitable and Penal Institutions*" is the subject of the next special report by the Board. And while these institutions, in their sanitary aspects, will bear favorable comparison with the hotels at Long Branch, they are not what they should be, chiefly by reason of the *political* qualifications—in New Jersey as elsewhere in the United States. The relations of disease, pauperism, vice and crime are thoroughly recognized by the accomplished Secretary of the State Board, who makes this report; and there is no room to question that if the power of the Board were enlarged and made plenary in regard to these institutions, they would soon become here, as in England, the healthiest domiciles in the State.

Next follow special contributions on sanitary subjects, as follows: School Hygiene, by James Green; Protection of Schools from Uncleanliness and Contagious Diseases, by Rev.

F. R. Brace; Abstracts of Papers and Addresses of the New Jersey Sanitary Association; Trades and Occupations, by Ezra M. Hunt, M.D.; Summary of Reports from Local Boards, by the Secretary; Report of Committee of Public Analysts and Inspectors of Milk, Kerosene and Malt Beverages, by Messrs. A. R. Leeds, S. Wallace, Wm. K. Newton and H. B. Cornwall; Report of the Milk Inspector, Wm. K. Newton, M.D., and various practical circulars for the use of correspondents and others in co-operation with the Board. A medical registry of the physicians entitled to practice in accordance with the "Act to Regulate the Practice of Medicine and Surgery," is given; and following this, the Report of the Bureau of Vital Statistics for the statistical year ending June 30, 1883, by the Secretary, Ezra M. Hunt, M.D., who is also Medical Superintendent of Vital Statistics. The introduction to this report so ably summarizes the importance of a careful registration of the main fcats under this head in their relation to sanitation and the general well-being of the community, that we publish a liberal abstract of it on other pages, under the head of " The Progress of Sanitation and Decrease of Mortality as Measured by Vital Statistics."

The totals of recorded facts in the elaborate statistical tables of this report are:

Population (census of 1880), 1,131,117; Marriages, 9,166; Divorces, 183; Births, 24,430; Deaths, 23,310. Rates per 1,000 for five years: Marriages, 15.10; Divorces, 18.50 (per 1,000 marriages, 2,000 persons, or 1 to every 54.24 marriages); Births, 21.47; Deaths, 19.43.

Taken altogether, the report is full of instructive information for the people, and should be liberally distributed.

NEW YORK.—Governor Cleveland has nominated new members to fill vacancies in the State Board of Health, created by the death of Dr. Elisha Harris, and the expired terms of other members, as follows: Dr. Woolsey Johnson, of New York, in place of Prof. C. F. Chandler; Dr. Geo. W. Cooke, in place of Dr. Elisha Harris, deceased; Dr. Alfred Mercer, of Syracuse, in place of James G. Hunt, of Utica; Dr. Edward M. Moore, of Rochester, Dr. J. S. Delavan, of Albany, Hon. Erastus Brooks, of West New Brighton, Staten Island, re-appointed. The *ex-officio* members are: Dr. Wm. M. Smith, Health Officer

of the Port of New York, James T. Gardiner, C.E., Superintendent of State Survey, and Dennis O'Brien, Attorney-General of the State. Dr. Alfred L. Carroll, of New Brighton, Staten Island, Secretary, elected by the Board.

TYPHUS AND TYPHOID FEVERS continue to occupy the attention of the New York Board of Health—by inspecting the causes *after* they have done their fatal work. During the three months ending with March, 29 cases of typhus, with three deaths, and 119 cases of typhoid, with 24 deaths, were reported and looked after—about three times as many of the former and seven more of the latter than for the corresponding period of 1883. And now we are informed the Board of Health is engaged in the inquiry whether the disease is not introduced by immigrants by way of the overcrowded and filthy vessels bringing emigrants from the north of Europe. This may be, but if so it is only adding fuel to the smoldering embers existing in thousands of abominably filthy back yards and overflowing privy vaults in those parts of the city which are the resorts and lodging houses of the poor immigrants who are accused of introducing it. It is at least quite as likely that, in their exceedingly vulnerable condition, they have there contracted it. And so long as such filthy conditions are tolerated by the Health Department—and only looked after as cases are reported by the physicians called in to attend them *pari passu* with the progress of the disease—just so long is it likely to continue and increase. These filthy nests are in constant process of incubating diseases which cost the city annually many times more for the maintenance of hospitals and other charities for the care of the victims and the burial of the dead—to say nothing of the misery induced—than it would to effectually abate them forever.

PHYSIOLOGY AND HYGIENE IN PUBLIC SCHOOLS.

The following is the New York law recently passed in relation to the study of Physiology and Hygiene in public schools:

SECTION 1. Provision shall be made by the proper local school authorities for instructing all pupils in all schools supported by public money, or under State control, in physiology and hygiene, with special reference to the effect of alcoholic drinks, stimulants and narcotics upon the human system.

§ 2. No certificate shall be granted to any person to teach

in the public schools of the State of New York after the first day of January, eighteen hundred and eighty five, who has not passed a satisfactory examination in physiology and hygiene, with special reference to the effects of alcoholic drinks, stimulants and narcotics upon the human system.

1. No particular day being named in the act on which it shall take effect, under the Revised Statutes, part I, chapter 7, title 4, section 12, it became a law on the twentieth day after its passage, namely, March 30, 1884.

2. The language of the act is very broad, and its provisions apply to all District Schools, Union Free Schools, Public Schools organized under special statutes in cities and villages, Normal Schools, Indian Reservation Schools, and Separate Neighborhood Schools.

3. It applies to all pupils in the above named schools, to State pupils in all institutions for the instruction of the deaf and dumb, and blind, and to pupils in such Asylum schools as share in the apportionment of the public school money.

4. This act does not conflict with the act of 1877 to prevent frequent changes of text books in schools, but is to be construed and executed in harmony with the provisions of that statute.

But there appears nothing about the law requiring its enforcement—there is no penalty attached to its neglect. A certificate of competency under it may simply affirm that the holder considers "alcoholic drinks, stimulants and narcotics upon the human system," unnecessary and injurious to the human system in health—as all sensible people do—and that is the end of it. Instruction in Physiology and Hygiene in the Public Schools of New York is, we fear, no nearer accomplishment under such a law than without it.

OHIO STATE SANITARY ASSOCIATION.

To Editor of SANITARIAN: I desire to make at least one correction to your report, which says the object of our meeting "was to create a sentiment in favor of the passage of the Scott bill."

As the organizer of the Association and a personal friend of Dr. Scott, of Cleveland, whom I have been aiding in the passage of his bill, that statement is not correct. The object of the meeting was stated in the call, as follows:

"*Whereas*, The increase of population, without an equivalent proportion of sanitary care, favors the development and spread of preventable diseases, so fatal to the lives of our citizens, and so destructive to human happiness and real prosperity; and

"*Whereas*, Proper and wise sanitation, systematically and scientifically administered, will not only very greatly prevent their spread, but modify their fatality generally; and

"*Whereas*, At present there is no State Board of Health or any other State organization for the general care of the public health of our citizens through the general diffusion of sanitary knowledge and by the enactment and enforcement of wise sanitary laws; and

"*Whereas*, The organization of a State Sanitary Association with which county and local organizations and Boards of Health can co-operate, and by systematic work diffuse among the people a greater knowledge of the laws of preventing all preventable diseases, such as diphtheria, scarlet fever, small-pox, typhoid fever, measles, whooping cough, and all allied diseases, would be of vital importance to every citizen in the State of Ohio; therefore be it

Resolved, That we, the undersigned citizens of.....
.....County of.....and State of Ohio, do hereby request and urge the organization of a State Sanitary Association, and promise our encouragement and influence to such, and if possible for us to do so will attend a meeting at some future date at some suitable place in the State for the organization of such an important Association to the public health and life of every citizen in this prosperous commonwealth."

The Scott bill, however, was by minute read and thoroughly discussed, and a committee appointed to revise it; and the Secretary instructed to send copies to each County Medical Society for signers to a petition to the Legislature for its passage, which will probably be pushed next winter. But to say the object of the Association was to create a sentiment in favor of that particular object, is not only too circumscribed, but really not true, and placing the Association and its object in a wrong light.

R. HARVEY REED, M.D., *Secretary*.

MANSFIELD, O., April 7, 1884.

MARINE HYGIENE—WITH SPECIAL REFERENCE TO THE NEGLECT OF SANITARY PRECAUTIONS FOR THE PREVENTION OF SCURVY.

Apropos to Dr. Turner's valuable contributions to this subject in the present and the preceding number, our associate, Dr. Corbally, has given us the following note of two cases of scurvy recently under his observation in St. Peter's Hospital, Brooklyn:

"One of the patients was the master and the other the mate of the three-masted schooner Carl August, which sailed from Manta, Ecuador, on the 14th of September, 1883, passed Cape Horn on the 14th of November, and did not arrive in Brooklyn until 11th of February, 1884, having made the voyage in 148 days from port to port. Shortly after turning the cape the captain's feet began to swell, then the upper part of the foot turned a blue-black color. Somewhat later, large patches extended from the ankles to the knees; then the arms were affected, and, lastly, the mouth and gums. The mate gave a history very similar, but the disease was less severe. The captain was confined to bed the greater part of the time; the mate went on deck occasionally, but was unable to do any duty. Before arrival at New York the steward died and was buried at sea. Both patients were admitted to the hospital on their arrival at Atlantic Dock and made very rapid recoveries. Towards the end of February the mate was discharged nearly well because he wished to return to his ship. He continued to come to the hospital for a couple of weeks longer for advice. The captain, who was extremely weak on his admission, remained until the middle of March before he was discharged. The captain, who is a very intelligent man and a good observer, thinks he has never observed any good effect from *saur-kraut* (he had no other remedy), either as a prophylaxis or as a remedy.

T. P. CORBALLY, M.D.

EXPLOSIONS AND DEATH IN THE MINES.

When Sir Humphrey Davy discovered or invented the Safety Lamp, to be used by miners, it was thought that great good would result from its use, but whilst some good may have been done by the Safety Lamp, the explosions and destruction of life in the mines of England have continued to go on, and have been recently very great, and in this country they continually occur, as in the dreadful case at Pocahontas, Va.

Now the remedy or prevention that I propose is very simple; that is, to force a current of fresh air to the bottom of the mine to ventilate or aerate it, by means of a leather pipe or tube, made like a hose-pipe, six or ten inches in diameter, carried to the bottom of the mine, and by means of a steam engine or a wind-mill stationed at the mouth of the pit, force in a current of fresh air, which would dissipate or destroy the fire damp or choke-damp in the mine.

Let this be tried at once. Perhaps in very deep mines it may not succeed, where other means have failed.

EDGAR F. PECK, M.D.

BROOKLYN, N. Y., April 16, 1884.

VITAL STATISTICS OF IMMIGRATION.

NAMES OF STEAMERS, DATE OF ARRIVAL, PORT OF DEPARTURE, NUMBER OF PASSENGERS, NUMBER OF DEATHS AND BIRTHS DURING THE VOYAGE FROM EUROPEAN PORTS TO NEW YORK, FOR THE MONTH ENDING MARCH 31, 1884.

	Vessels.	*From*	*Passengers.*	*Deaths.*	*Births.*
March	1, Circassia,	Glasgow,	245	1	
"	3, Servia,	Liverpool,	484	1	
"	3, Rhein,	Bremen,	575	2	
"	3, California,	Hamburgh,	651	1	1
"	9, Belgenland,	Antwerp,	379	1	
"	9, Weser,	Bremen,	305	2	
"	12, Gellert,	Hamburgh,	937		2
"	13, Nurenberg,	Bremen,	419		2
"	13, St. Laurent,	Havre,	313	1	
"	16, Waesland,	Antwerp,	354		2
"	21, City of Chester,	Liverpool,	403	1	
"	21, Rhaetia,	Hamburgh,	1,296	3	2
"	22, Canada,	Havre,	509		1
"	22, Thingralla,	Copenhagen,	336	1	
"	22, Bolivia,	Glasgow,	356	1	1
"	22, Nebraska,	Glasgow,	423	1	
"	23, Neckar,	Bremen,	887		1
"	25, City of Chicago,	Liverpool,	426		1
"	20, Australia,	Hamburgh,	447	2	1
"	27, Moravia,	Hamburgh,	1,466	1	
"	27, Zaandam,	Amsterdam,	359	1	
"	28, Oder,	Bremen,	819	1	
"	29, Eider,	Bremen,	1,124		2
"	29, Caledonia,	Gibraltar,	51	1	
"	31, Polaria,	Hamburgh,	525	1	2
"	31, Switzerland,	Antwerp,	459	1	
			14,548	24	18

MORTALITY STATISTICS IN THE UNITED STATES

FIVE WEEKS,

ENDING MARCH 29, 1884.

Correspondents under this head are requested to send reports promptly.

	Total Deaths.	Deaths under 5 years.	Lung Diseases.	Diphtheria and Croup.	Scarlatina.	Measles.	Whooping Cough.	Fevers.	Small Pox.	Diarrhœal Diseases.	Annual rate per 1,000.
Burlington, Vt., 11,364	18	2	7	..	..	..	..	..	..	..	16.3
Boston, Mass., 427,940	875	278	282	45	16	..	9	7	..	28	21.2
*Lowell, Mass., 70,000	120	46	31	4	..	..	2	2	..	1	19.5
Lynn, Mass., 38,284	66	13	20	..	..	..	..	..	..	..	17.2
Somerville, Mass, 28,663	42	18	16	2	..	..	..	..	..	..	15.1
Worcester, Mass., 58,295	41	15	12	..	2	..	..	1	..	..	7.3
‡Providence, R. I., 120,000	159	44	38	10	1	3	..	2	..	2	15 9
‡New Haven, Ct., 72,000	..	..	..	..	..	..	..	..	..	..	....
New York, N. Y., 1,325,092	3205	1148	1088	160	71	34	28	90	..	77	24.56
Brooklyn, N. Y., 624,118	1169	446	373	71	39	8	8	25	..	19	18.8
Buffalo, N. Y., 155,159	..	..	..	..	..	..	..	..	..	..	....
Rochester, N. Y., 101,900	146	38	55	..	1	..	1	3	..	..	14.8
†Albany, N. Y., 97,344	157	51	55	5	5	..	6	8	..	1	27.9
‡Auburn, N. Y., 25,000	34	10	7	5	2	..	1	2	..	1	16.3
*Yonkers, N. Y., 21,000	21	8	8	..	..	..	..	..	..	..	12.6
West Troy, N. Y., 13,000	19	3	..	7	1	..	..	1	..	..	15.2
Hudson Co., N. J., 209,000	413	143	136	15	7	..	1	15	..	3	20.4
Paterson, N. J.	..	..	..	..	..	..	..	..	..	..	....
Philadelphia, Pa., 927,995	1968	644	515	122	68	6	7	79	4	15	22.5
Pittsburgh, Pa., 180,000	357	169	147	15	5	1	2	10	..	..	19.5
Erie, Pa., 27,730	46	18	18	4	2	1	1	1	..	2	17.2
Wilmington, Del., 51,500	92	35	26	4	1	1	..	2	..	2	18.5
§Cincinnati, Ohio, 280,000	195	57	67	2	1	..	3	3	6	3	18.1
Cleveland, O., 200,429	308	121	76	22	..	..	3	9	..	6	15.8
Toledo, O., 52,000	87	39	11	2	3	..	5	3	..	..	20.0
Detroit, Mich., 135,000	302	130	77	47	2	1	1	2	..	..	23.4
Indianapolis, Ind., 100,000	..	..	..	..	..	..	..	..	..	..	....
Evansville, Ind., 40,000	100	40	32	1	..	..	..	5	..	3	26.0
Rock Island, Ill., 11,650	23	8	10	..	..	..	..	2	..	..	20.3
‡Chicago, Ill., 580,000	905	421	242	53	29	6	6	29	..	14	18.7
St. Louis, Mo., 400,000	685	243	196	45	21	1	2	15	..	14	17.7
‡Milwaukee, Wis., 145,000	158	46	30	14	4	..	..	1	..	2	13.1
Omaha, Neb., 50,000	74	28	28	1	3	1	..	1	..	1	13.8
Salt Lake City, Utah, 22,000	42	16	14	2	1	..	..	1	..	..	19.9
*San Francisco, Cal., 235,000	271	93	112	9	3	..	7	14	..	1	11.8
Minneapolis, Minn., 90,000	101	41	32	8	..	..	1	3	..	2	11.5
St. Paul, Minn., 100,000	94	35	19	11	2	..	1	3	..	..	9.8
Baltimore, Md., 408,520	801	342	230	35	16	57	10	26	..	5	18.3
Dist. of Columbia, 194,910	468	166	150	8	35	11	6	9	..	8	24.3
‖Richmond, Va., 66,000	98	23	35	..	1	..	2	2	..	..	16.1
Lynchburg, Va., 20,240	59	16	18	..	3	1	..	1	..	1	60.8
New Orleans, La., 234,000	693	219	178	9	1	33	8	31	57	25	31.1
Nashville, Tenn., 50,000	..	..	..	..	..	..	..	..	..	..	....
Mobile, Ala., 31,000	..	..	..	..	..	..	..	..	..	..	....
Jacksonville, Fla., 10,000	12	3	..	..	..	..	..	..	..	1	12.4

* 4 weeks; † 3 weeks; § 2 weeks; ‖ 1 week; ‡ Month of March.

MORTALITY STATISTICS ABROAD.

FOUR WEEKS, ENDING MARCH 15, 1884.	Total Deaths.	Deaths under 1 year.	Bronchitis and Pneumonia.	Diphtheria and Croup.	Scarlatina.	Measles	Whooping Cough.	Typhoid and Typhus Fevers.	Small-pox	Diarrhœal Diseases.	Annual rate per 1,000.
London, 4,019,361	6334	1464	1242	101	113	181	365	67	24	74	20·6
Liverpool, 573,202	1051	240	..	4	14	32	38	15	6	8	27·8
Glasgow, 517,941	1027	221	218	16	20	11	72	23	1	15	25·7
Birmingham, 421,258	651	158	..	5	10	20	10	5	9	4	20·1
*Dublin, 351,014	168	26	28	3	3	..	2	4	..	2	24·9
Manchester, 338,296	779	194	..	4	27	37	24	1	..	12	30·0
Leeds, 327,324	617	106	..	8	62	14	9	6	..	11	29·1
Sheffield, 300,563	493	133	..	2	34	..	13	2	2	4	21·4
Edinburgh, 246,703	402	66	89	12	10	14	15	9	..	5	21·1
*Belfast, 216,622	99	20	26	..	4	..	4	..	..	4	23·8
Bristol, 215,457	334	80	..	1	2	1	6	4	..	3	20·2
Bradford, 209,564	295	70	..	..	..	6	4	5	..	2	18·3
Hull, 181,225	269	55	..	5	5	1	4	6	..	3	19·3
New Castle, 151,325	271	62	..	2	20	..	10	3	2	5	23·3
*Havre, 105,867	55	10	9	1	1	..	2	1	..	3	27·0
Reims, 93,823	187	48	26	10	..	4	2	3	..	28	25·8
†Nancy, 74,954	72	14	11	2	..	1	..	1	1	..	23·9
†Breslau, 290,000	367	106	38	13	2	14	..	6	..	18	33·0
Brussels, 171,293	327	63	59	4	..	1	14	3	4	35	29·6
Cologne, 150,513	287	88	14	5	..	..	12	1	..	4	24·8
Christiana, 122,000	208	66	62	6	11	..	3	..	..	10	22·0
FOUR WEEKS, ENDING MAR. 8, 1884.											
Frankfort, 145,100	234	69	22	11	3	..	7	1	..	6	21·6
Hanover, 131,200	200	35	14	7	8	..	..	2	..	..	19·8
Bremen, 119,561	179	53	35	11	2	..	6	1	..	2	19·4
Dantzic, 116,162	218	82	19	11	3	..	5	2	..	13	24·3
Stuttgart, 109,937	213	67	28	8	..	1	5	..	..	10	22·6
†Strassburg, 110,739	119	52	23	4	..	7	1	..	..	16	27·9
Dusseldorf, 105,287	214	80	25	2	..	3	1	..	..	14	26·4
Nuremberg, 105,176	198	71	39	5	4	..	3	..	..	16	24·5
Chemnitz, 102,713	288	114	16	22	4	3	..	2	..	3	34·4
Madgeburg, 105,000	212	68	20	10	3	12	4	..	..	7	26·2
Elberfeld, 101,000	206	44	19	10	6	..	9	2	..	4	26·5
Barmen, 100,000	172	51	14	7	5	..	3	1	..	6	22·3
Altona, 97,000	204	53	14	1	2	1	9	2	..	10	27·3
Aix-la-Chapelle, 89,116	183	59	31	1	..	1	5	1	..	7	26·7
Mayence, 64,120	97	17	11	2	2	..	1	1	..	1	19·6
Amsterdam, 350,202	771	..	..	92	5	19	4	4	..	..	27·7
Rotterdam, 166,001	335	..	..	14	7	..	2	1	..	2	26·2
The Hague, 131,417	243	..	..	2	1	..	4	..	..	1	24·0
Lyons, 376,613	812	..	145	18	..	12	5	7	36	21	27·9
Berlin, 1,225,065	2155	617	128	247	32	8	24	10	6	79	22·6
Hamburg, 486,678	936	258	..	37	13	6	15	7	..	63	25·0
Dresden, 236,000	524	138	53	51	5	2	12	3	..	10	28·8
Munich, 240,000	589	187	76	20	6	14	12	..	..	47	31·7
Leipsic, 164,636	324	112	26	34	3	4	5	2	..	9	28·7
Kœnigsberg, 154,000	381	137	29	18	15	..	2	3	..	25	32·1
Bucharest, 200,000	525	172	112	19	9	..	2	10	..	16	34·3
‡Paris, 2,239,928	4513	661	460	266	16	121	46	155	11	271	25·7
§Calcutta, 433,219	..	..	..	..	..	..	..	..	257	..	..

* 1 week; † 2 weeks; ‡ 4 weeks, March 13; § 1 week, Apr. 12, Cholera, 257.

LITERARY NOTICES.

PARKES' HYGIENE, WITH AMERICAN SUPPLEMENT.—A Manual of Practical Hygiene, by Edmund A. Parkes, M.D., F. R.S., etc., etc., edited by F. S. B. Francois de Chaumont, M. D., F.R.S., etc., etc., from the last London edition, with an Appendix, giving the American practice in matters relating to hygiene, prepared by and under the supervision of Frederick N. Owen, Civil and Sanitary Engineer. Two volumes in one. 8vo., pp. 946. Price $4.00. New York: Wm. Wood & Co.

All sanitarians will be glad to learn of the republication of this incomparable work, in the convenient form here announced. So frequently have we had occasion to notice this most comprehensive of all manuals on practical sanitation, and to cite it as the highest authority on the subjects of which it treats, that it will suffice to state no one engaged in practical sanitation can afford to do without it.

BACTERIA AND THE GERM THEORY OF DISEASE.—Eight lectures delivered at the Chicago Medical College by Dr. H. Gradle, Professor of Physiology, Chicago Medical College; Oculist to the Michael Reese Hospital. 8vo., pp. 219. Chicago: W. T. Keener.

This work is an excellent presentation of a subject on which much has been said and written, of which it is a sifting and condensation from a practical standpoint, as related to the etiology of disease, and practical medicine and surgery. It discussess the natural history of the low organisms known as germs, gives instruction in classification and examination, the means by which they become infective, and the practical methods of prevention.

"MEDICAL ANNALS OF BALTIMORE," from 1608 to 1880, issued by the Medical and Chirurgical Faculty of Maryland, as a Memorial Volume, in honor of the Sesqui-Centennial of Baltimore, October, 1880, edited by John R. Quinan, M.D., Member of the Faculty, is an exceedingly interesting compilation to physicians in general and to those of Baltimore in particular. It comprises:

1. A chronology of events connected with the progress of medicine in Baltimore from 1608 to 1889.

2. A biography of Baltimore physicians, to which is appended a record of their literary contributions.

3. A subject index to the literature.

4. A record of public services, military, civil and medical, performed by Baltimore physicians from 1608 to 1880, in the City, State and National Governments, with statistics of the charitable and public institutions of Baltimore.

After private distribution among the members of the "Faculty," there remain about 500 copies, which the committee has been authorized to sell *at cost—one dollar per copy*—post-paid. Every physician, and the relatives of deceased physicians, of Baltimore and Maryland at least, should have a copy, Orders enclosing the required amount sent the librarian, DR. E. F. CORDELL, 122 *West Fayette Street, Baltimore*, will be filled as soon as received.

EDUCATION, for March–April fully maintains its standard of excellence—the best of educational magazines. This number has for frontispiece a fine portrait of Hon. Wendell Phillips. The leading contributions are: The Nation, the only Patron of Education Equal to the Emergency—Gen. John Eaton, Chief of the Bureau of Education; Application of the Principles of Psychology to the Work of Teaching—John E. Bradlee, Ph.D.; Industrial Education, and Industrial Drawing as One of its Elements—S. E. Warren, C. E.; Origin of the First German Universities—G. G. Bush, Ph.D.; Duties of School Superintendents—John T. Prince, A.M., and as many other papers on equally interesting topics by distinguished writers. Boston: New England Publishing Co.

DIAGNOSIS AND TREATMENT OF THE DISEASES OF THE HEART, by CONSTANTINE PAUL, Member of the Academy of Medicine; Physician to the Lariborière Hospital. Translated from the French. 8vo, pp. 341, with numerous illustrations.

This is the March volume of "Wood's Library of Standard Medical Authors," current series, obtainable by subscription only. It fulfills in a marked degree the qualities common to this popular library—the publication of such works as present the subjects treated of on the highest plane of scientific truth.

The progress made in the study and treatment of the diseases of the heart, scattered through periodical literature in recent years, is here admirably summed up by an author who has extensive clinical opportunities for study and comparison. The work is alike valuable to student and practitioner—a safe guide to both.

THE PATHOLOGY, DIAGNOSIS AND TREATMENT OF DISEASES OF THE RECTUM AND ANUS, by Charles B. Kelsey, M.D., Surgeon to St. Paul's Infirmary for Diseases of the Rectum; Consulting Surgeon for Diseases of the Rectum to the Harlem Hospital and Dispensary for Women and Children. 8vo, pp. 429, with 200 chromo-lithographs and nearly 100 illustrations. Price $4.00.

This is a republication of, with important additions to, the volume contributed by the same author to "Wood's Library of Standard Medical Authors" in 1883. It is an eminently practical work, derived in a large degree from clinical study, and comprehending an amount of information not easily acquired elsewhere.

DETERIORATION OF THE PURITAN STOCK, AND ITS CAUSES. By John Ellis, M.D., Author of "The Avoidable Causes of Disease," "Marriage and its Violations," etc., is a pamphlet of fifty-two pages, which exhibits an increasing prevalence of immoral and debasing practices throughout New England, humiliating to every instinct of true humanity. New York: Published by the author.

HAND-BOOK OF SANITARY INFORMATION FOR HOUSEHOLDERS. Containing Suggestions about Ventilation, Drainage, Care of Contagious Diseases, Disinfection, Food and Water. With Appendices on Disinfectants and Plumbers' Supplies. By Roger S. Tracey, M.D., Sanitary Inspector of the New York Board of Health. 16mo, pp. 110. New York: D. Appleton & Co.

HEALTH AT HOME. By A. H. Guernsey, and Irenæus P. Davis, M.D., Author of "Hygiene for Girls." 12mo, pp. 155. New York: D. Appleton & Co.

These are both excellent little books for the general reader, treating of subjects with which all persons who have regard for the preservation of their own health, or for the health of those

who depend upon them, should be familiar. Dr. Tracey limits his instruction to preventive measures and the means of applying them exclusively. Drs. Guernsey and Davis add to their instruction on the sanitary care of surroundings, household practice in emergencies—for simple complaints, accidents and poisons.

THE CENTURY for May begins a series of profusely illustrated papers on "Recent Architecture in America." "Public Buildings" is the subject of the first article. The writer of the series is Mrs. Schuyler Van Rensselaer, whose recent papers on "Art and Artists" have shown knowledge, careful study, appreciation, and felicity of statement.

IMMIGRATION continues to be one of the great economic questions of this country, and it involves a political problem of the highest importance, that of naturalization. That our naturalization laws are defective in many respects is notorious, and the demand for their revision will no doubt acquire added force from the publication of an article by Justice William Strong upon that subject in the *North American Review* for May.

LEGISLATION FOR THE MARINE HOSPITAL SERVICE.—To such a pass has this service come, that, in the March, 1884, number of the *Detroit Lancet*, a leading medical journal in Michigan, we find the following editorial:

The ship-owners and sailors have had bills introduced into Congress repealing the tax upon sailors for the support of the Marine Hospital Service, and ordering that the same be supported by the Government. We would like to see the tax and hospitals both abolished. This entire service is an anomaly in our plan of government. There is no more reason why there should be a series of hospitals for the care of sailors, supported by the government, than that the government should have hospitals supporting railroad men, or factory operators, or any other class of laboring people. Since the government does not do this for all classes, we object to any discrimination in favor of any class. We already have a navy medical service, to care for all the sick sailors in the service of the government. This suffices. Were it needful for the government to extend aid to any class on the water, it were best done by this service. But there is no need whatever. The sailor would be better cared for and be trained to make a better citizen if he were

treated like all other classes of citizens. This matter is one of importance, but it will scarcely receive the attention it demands while the government department to which it belongs deems it of such value in enabling it to exert a powerful influence toward the accomplishment of its purposes. In short, so long as it has so large a patronage at its disposal it will have vigorous defenders, for who will not fight for his bread and butter, and find weapons of offense and defense? The reform in this matter must come from those whose interests are not interfered with by the abolition of this service.

PERPETUAL INJUNCTION.—In the United States Circuit in Maryland, it was, on the 10th of March, 1884, adjudged and decreed that a perpetual injunction be issued against Louis E. Wetter and eighteen others, restraining them from imitating the labels of the Rumford Chemical Works, manufacturers of Horsford's Baking Powder, and also from using their old bottles.

The defendants were required to bring into court all fraudulent labels, and all imitation powder, for destruction.

It was decreed that the Rumford Chemical Works be entitled to receive the profits which have been diverted from it by reason of the infringement, and the defendants were ordered to pay all costs.

Thus is another victory scored for the Rumford Chemical Works, who, not long since, caused several parties to be heavily fined for violating the injunction of the Supreme Court restraining all persons from offering for sale "Acid Phosphate" (so called) in any package which shall be a substantial or colorable imitation of Horsford's Acid Phosphate.

PUBLICATIONS RECEIVED.

Annual Reports of the National Board of Health, 1880 and 1881; Chesney's Shakespeare as a Physician; Billings' Relation of Animal Diseases to the Public Health; Transactions of the New York Medico-Chirurgical Society, 1883; Gerhard's Sanitary Drainage of Tenement Houses; Report of Superintendent of State Asylum for Insane Criminals, Auburn, N. Y.; Report of Resident Physician of Brigham Hall Insane Hospital; Remarks before the Committee on Public Health of the House of Representatives, by Drs. J. L. Cabell, Stephen Smith and Chas. Smart, and by Col. Geo. E. Waring and Thomas Simons, Esqr., of the Department of Justice, members of the National Board.

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NUMBER 175.

CANNED GOODS.*

By JOHN G. JOHNSON, M.D., of Brooklyn, N. Y.

Having had in my practice six cases of corrosive poisoning from eating canned tomatoes, finding that none of our works on toxicology gave any information on the dangers of canned goods, and none of the medical works accessible furnished anything to guide the physician on this subject, after consulting the chemist and former chemist of the Board of Health of Brooklyn, and gaining no information from them, it was thought proper that I should bring the matter before this society, from which have emanated so many laws beneficial to the community; that by means of the advice obtained from the eminent lawyers, physicians and chemists composing your body, such knowledge should be secured as will be of service to physicians in the future, should similar cases unfortunately occur in their practice, and necessary legislation be obtained, if that be deemed advisable, to prevent danger in the future. Cases of severe sickness have been reported from time to time in various parts of this country from eating canned food. I know of none of these that have been thoroughly sifted so as to place the facts in reliable form before those who are compe-

* Paper read before the New York Medico-Legal Society, Feb. 9, 1884.

tent to judge of a matter so important to the community as its food supply. While there is no doubt that the preservation of food in hermetically sealed cans has added much to the health and comfort of the public, still it is no less certain that unscrupulous tradesmen have dealt in damaged, unsound and unwholesome canned food, and that serious sickness has occurred therefrom, both in this country and abroad, till public confidence has been shaken and a large portion of the community look with doubt and distrust upon all food thus preserved. That this suspicion is not without foundation is shown by the fact that a single issue of the *Trade*, a newspaper published in the canning interest in Baltimore, gives in a single issue the names of fifty-seven firms that deal only in "seconds," or doubtful goods, as a warning to retail grocers not to purchase them. To still further aid in elucidating this question, I have, through the kindness of your President, been allowed to invite representative men from the canned goods trade to present their views to you upon this subject, so that this body should have information from their standpoint to aid in the forming of such opinions as may be deemed best upon this important question.

The history of the cases, briefly, is this: On Thursday, March 6, 1884, the family of Mr. K., of Brooklyn, sat down to a lunch, consisting of bread, butter, and canned tomatoes. The family consisted of Mrs. K. (the mother), Theodora, aged 22 years; Grace, aged 18; John, aged 13; and Osceola, aged 10. A nephew happening to call at that time, also sat down to lunch with them. Mr. K. was not at home to lunch. The family are strong, hale and vigorous, with whose constitution and habits I have been acquainted—having been their physician—for over twenty years. They all sat down to the table in perfect health. About two hours after the lunch they were all taken with burning pain in the pit of the stomach, intense thirst, dryness of the throat, retching and tenesmus. The symptoms increased. At supper-time none were able to be at the table. Mrs. K., thinking they were suffering from some indigestible food, gave them all a cathartic. The boys, after some hours, were able to throw off the contents of their stomachs, but lay around stupid and cross, and complaining of the pains in their abdomen, while the symptoms in the mother's

case and the daughters' continued to increase. The mother, finding that laxatives and anodynes had no effect, sent for me on the morning of the 10th. At this time Theodora's case had become alarming; there was a severe gastro-enteritis. The abdomen intensely tender, the tongue of a fiery red, the tenesmus so severe that the bowel would turn inside out, like the finger of a glove, with the severity of the bearing down in the ineffectual efforts to pass the contents of the bowels. She was beginning to sink into a coma, aroused only by the severity of her pains. The mother was suffering from the same symptoms, and the daughter, Grace, had, in addition, an eruption from head to foot, of a fiery red, with intolerable itching, and her skin, which is naturally soft and smooth, was as rough as a nutmeg grater. This stupor passed into a coma so profound that I could not arouse her by any means at hand, even taking hold of the small hair in front of the upper portion of the ear and lifting the head from the pillow, would not cause even a quivering of the eyelids. In the evening of Friday, the 14th, she was taken with epileptic-form of convulsions, so severe and continuous that I instinctively looked to see if there was crape on the door each time that I drove up to the house. These convulsions continued with increasing severity till Sunday afternoon, when her bowels began to move, and a dark, tarry black fluid substance passed from her at stool. On this being allowed to stand, on the top was seen floating a glistening fluid, which showed rainbow colors like oil on water. As the Board of Health had the case under observation, I directed all evacuations to be kept for their chemist, and this was done; but, unfortunately, he made no chemical examination, contenting himself with reporting that the disease was probably caused by spoiled fruit, and sagely advising the public when they found food rotten they should not eat it. During all the time that she was in this coma and convulsions she lay in a drenching colliquative sweat, with a thready pulse. After the dark, tarry movements there were bloody stools—not the small, teasing, straining stools with mucus and blood of dysentery, but hemorrhages of quite a large amount, mingled with this tarry matter. As the coma passed off it was found that there was an impairment of nerve power in the left arm, which gradually subsided, with the exception of the muscles controlled

by the ulnar nerve. There were no marks of bruises on the arm, and no indication of any straining of the joints from the convulsions, and this paralysis of the left arm was attributed to the effects of the poison. A swelling localized the size of the fist in the left iliac fossa made its appearance, and it was feared that an adhesive peritonitis with perforation of the intestine and fæcal focal abscess would form; but, fortunately, that subsided to a large degree, and the probability is that it will cause no further trouble. As the symptoms of the others were similar, varying only in intensity, I will not detain you with the repetition. During the early part of the sickness she drank largely of milk to quench the intolerable thirst, but that was evidently healthy, as the same milk was served by the same milkman to neighbors, and careful inquiry failed to show that it had disagreed with any. That they were suffering from some irritant poison was evident, from the fact that they all sat down to lunch in perfect health, and all who partook of that lunch were sickened by it. That lunch was bread and butter and canned tomatoes; that the illness was not caused by the bread and butter was shown from the fact that the husband had eaten of the bread and butter at breakfast, and also at supper, and had no trouble. He had not been at home to lunch. Also, a lady who had come in to help them, had taken of the bread and butter for her tea, and had no trouble, while the nephew, who had only taken one meal at the house, and that was this lunch, had suffered severely from this colic, cramps, dizziness and stupor, and was, after some hours, relieved by vomiting, but his pains continued in the abdomen for several days. This limited the poison to the tomatoes. Could it have resulted from spoiled tomatoes? No. Why not? Because the sickness resulting from that would have been simply cholera morbus, vomiting, purging and cramps. That would not produce vertigo, coma, convulsions and obstinate constipation. Having for many years attended persons engaged in the wholesale grocery business, I know something of the method of preparing tomatoes. Before putting on the cap a hole is punched in it. Afterward the can is filled and the cap is soldered on and the can is put in boiling water This drives out the air, and the hole is soldered up. As the can becomes cold the heads bulge in and stay bulged in. Now, if decomposition begins, the heads bulge

out. The gases that form inside of the can distend and force out the heads. In the language of the trade, such cans are "swells." It was a well-known trick of unscrupulous dealers to go round to the wholesale trade and buy "swells." By punching another hole and heating, or "reprocessing," as termed by canners, the gases would escape, and the heads would assume their concave form again. But cans thus treated would have two solder holes instead of one. I examined the cans in question. They had only one solder hole. I went through all of the cans in two crates of these tomatoes left in the grocer's, and none had more than one solder hole, and none were "swells." Even if the tomatoes had begun to spoil, she had them cooked, and cooking would have cured that. Every housewife knows that if her preserves begin to sour, cooking prevents the souring. The reason may not be so generally known. The yeast plant and all ferments are killed by heat.

These ferments and all low forms of organization like bacteria multiply by division. To illustrate: If a chain should break up into separate links, and each separate link grow to make a new chain, and these new chains break up into separate links to again grow and make new chains, this would give you a good idea of the growth of these ferments. So with these ferments little buds form on the parent stalk. These fall off and grow and make new stalks for new buds to grow on. Putrefaction and decay instead of being death is really giving birth to myriads of little living plants whose food they furnish. Every decaying apple or banana or tomato, every muddy pool in your streets, every damp spot in your houses, is swarming with these tiny scavengers. They dry up and become spores and are blown around in the air, and if they light on anything capable of furnishing food they multiply with wonderful rapidity. Now heat kills all these. Why does your housewife keep her milk in a cold place? Because cold prevents these ferments from growing. Why does she scald the milk if it threatens to sour? Because heat kills these ferments. If she puts the dough in too cold a place it will not rise. Why? Because the yeast ferments will not grow. If she puts it in too hot a place it will sour. Why? Because these ferments multiply so rapidly that they devour all the saccharine matter in the flour, and destructive fermentation has taken place. Now heat

kills all these ferments, and if the tomatoes had commenced to decay, the heating would have destroyed that danger. It was not spoiled tomatoes. Could the poison have come from the utensils used? They were cooked in a stone crock; that is made of fire clay with a salt glaze. It was for over a month in use and the family were cleanly. The crock was examined by Dr. Bartley, the chemist of the Board of Health; by Mr. F. N. Barrett, the editor of the *Grocer*, the leading paper of the canning interest, and myself. All agreed it could not be that. Could it be from the spoon used in stirring? This was triple plated, unworn, and clean. That it came from the tomatoes, and that the poison was in solution, was shown from the fact that the eldest daughter had soaked her bread in the sop or liquid portion and she suffered the most severely; she had not eaten any of the tomatoes. The mother had also soaked her bread in the sop, but not liking the taste of it she had not eaten much of it. She suffered next in severity. The second daughter had eaten the soft part, or ketchup part, as she called it, and her symptoms were next in severity to the mother's; while the boys and the nephew, who had partaken of the solid part, had got off the easiest, having had simply the severe cramps, the colic, and finally vomited and "laid round stupid" that afternoon and evening, and in two or three days the pains in the abdomen were gone and they were at their play. The first impression would be that the poison was lead, from the well-known effects of acids on lead, and the fact that lumps of solder are often found in cans as well as the solder of the joints. The red tongue, the severe colic, the thirst and obstinate constipation looked like lead, but as the cases progressed and we had the stupor, colliquative sweats and severe and continuous convulsions, it required some other poison beside lead to account for these. It was something more than an irritant. It was evident they were suffering from some corrosive poison; what could it be? This is an extremely difficult question to determine, as admitted by all authorities on poison when you have none of the original material to analyze. The length of time the poison might have been in the diluting mixture might also modify the usual symptoms. The fact that the mouths, tongues and throat were not sore or excoriated showed that the poison must have been in a diluted state, or it would have

been noticed in the burning sensation produced in the mouth, and the first one who partook of it would have warned the rest.

Nothing could be gained from the history from the family in regard to the smell of what had been vomited, or the color or appearance, to guide. The only statement was that the tomatoes tasted flat, and the addition of salt and pepper did not bring up the taste, and the color of the tomatoes looked like a faded red. The mother did not pay much attention to the color because she thought it was caused by yellow and red tomatoes being stewed in the same kettle. The symptoms corresponded more nearly with verdigris poisoning, or the acetate of copper, and this seemed the probable cause, as it is a well-known fact that in these canning establishments large copper kettles are used, and verdigris frequently forms on these when acid fruits are stewed and allowed to stand. The kettles used in many of these establishments were known to be copper, and untinned and unprotected in any way from the action of acids. Naunyn in Ziemssen, vol. xvi, p. 590, reports that "in the Vienna General Hospital there were 130 cases of poisoning produced in this way—that is, by boiling or preserving food in copper kettles—nine of which proved fatal. He also says all these poisonings may become dangerous to life even when the amount of copper is not large enough to be clearly perceived by the taste. The symptoms laid down as resulting from verdigris poisoning are those of severe gastro enteritis, the existence of great tenesmus and pains in the large intestine. In comparatively many cases the nervous centres sympathize in a very large degree, as shown by the violent delirium, etc. Convulsions are not infrequently observed. These symptoms are, however, noticed chiefly in those cases of the copper poisoning caused by food in which the diagnosis is not perfectly clear." It was noticed that the tin was corroded from the head of the can around the cap on the inside and how far the lead of the solder and the tin combined to make this poison was a matter of doubt. Taking one of these caps to a trained tinsmith a flood of light was thrown upon the case. He showed me that this cap was not fastened to the head of the can by a resin amalgam, as the sides were, but that the amalgam was made of muriate of zinc. That is, pieces of zinc

were placed in muriatic acid and dissolved, and more zinc then placed in the acid till the acid would no longer attack the zinc, and this saturated solution of zinc was painted into the groove of the head of the can. The cap was then placed on and held with a clamp and the soldering iron passed around, the iron being heated to a great heat. Of course the solder held the acid in, it could not escape on the outside of the can, and if there happened to be too much acid applied to the groove then as the tin expanded with the heat it would be forced into the can. That this muriate of zinc amalgam was painted on with a brush, that boys were employed for this purpose, and if they happened to get the brush too full this acid was forced into the can. The can was coke tin. Terne tin is easily recognized from coke tin, the coke tin being known by its bright color, while terne tin is dull and shows the lead in its composition. He said this was a very favorite amalgam with roofers, on account of the quickness with which it could be applied, but that good architects and builders would not allow of its use, because it rotted the tin. This gave the explanation of the case. The well-known effect of chlorine as a bleaching instrument would explain the faded condition of the tomatoes, while if the poison had been from the verdigris then the color would be green from the staining of the verdigris. The same color may be seen in the imported French peas which are colored with it, and which our health authorities allow to be sold in the open market. The poison was a muriate of zinc and tin, the acid around the cap having eaten off the tin from the inside of the can. If the acid had not got into the can and attacked this part of the tin, there was no reason why this portion of the tin should not be as bright as the rest of the can. The inside of the can on the side where the resin amalgam was used was as bright as any other part, and the bottom of the can was also as bright around its edges as the rest. The contrast between these joints and that of the cap was so marked there could be no doubt of this poison. It was a double poison—muriate of zinc and muriate of tin. This, too, explained why it was that the eldest daughter had suffered the most. This poison had become dissolved in the liquid portion of the tomatoes. The oldest daughter had soaked her bread in the juice and eaten it, thereby getting the larger share of the poi-

son. The mother, who was the next severest afflicted, had also soaked the bread in the juice, but not liking it had not taken much of it, while the second daughter took the catsup part, or soft part of the tomatoes, and was the next severest afflicted, and the boys and nephew took the solid part and got off the easiest.

The *New York Herald* of April 18, 1883, and subsequently, had a series of articles on canning, written by some one who thoroughly understood the business, and the danger of poisoning by the escape of this muriate of zinc flux into the can is specifically pointed out. He reports an interview with a veteran canner, who has sealed thousands of cans, who says that he knows that this muriate of zinc has got into the cans he has sealed, and also that this danger has been known in Maryland, from the fact that the State of Maryland has a law prohibiting the use of this muriate of zinc flux. That this acid will attack the tin as well in a vacuum as out of it is shown by the facts of this case. I took the care to examine a dozen cans where this muriatic acid amalgam was used, and in all of them there was more or less of the tin dissolved off. In the *Herald* article there was a report of Professor E. B. Stewart, Secretary of the Illinois Microscopical Society, who said: "I take the liberty of calling your attention to a source of danger until now unsuspected by me from the use of canned vegetables, an instance of which came to my notice by happening to observe in my kitchen a few days since a can which had contained lima beans. The appearance of the upturned lid attracted my attention, and on examining the interior of the can more closely I found that the coating of the tin had been almost entirely dissolved from the iron, only patches remaining in places, to show that it had ever been tinned. A portion of its contents was submitted to proper chemical tests, which revealed the presence of tin in large quantities. It is probably well known to your readers that tin is, when taken into the system, poisonous. It has an irritant, caustic and astringent action, and in extreme doses convulsions and sometimes paralysis occurs. Like most other minerals, it may, when constantly taken in small doses, be retained till serious symptoms appear, and while the use of a single can of vegetables containing a considerable quantity would not be followed by fatal results, the constant use of food

strongly impregnated with this metal would in time be likely to produce serious consequences. Manufacturers should not find it a difficult matter to secure non-poisonous material for the making of cans. By simply leaving the thin plate of tin off the iron a package is obtained, which, for most vegetables, is unobjectionable, and in those cases where discoloration might follow the use of bare iron a japanned iron might be substituted. The use of solder can also be done away with by substituting a very hard cement, like the ordinary can wax, which is perfectly insoluble in the acid or other proximate principles of fruits and vegetables." The position the French Government has taken with regard to the danger from the lead poisoning in the cans can be best judged from the regulations established by the Director-General of Customs of France. I quote from the *Herald :*

"The Consulting Commissioner of Hygiene, to whom the question has been submitted, is convinced that, as far as the public health is concerned, there are serious objections to permitting the sale of products which, from the contact with solder or with surfaces covered with an alloy containing lead, might become the cause of poisoning. The Commissioner has consequently reported that there is reason to forbid makers of cans for alimentary conserves to solder on the inside of such cans or to employ in the manufacture of their cans tin of other than the best quality. The Commissioner of Hygiene has added that, if manufacturers insist on soldering on the inside of the cans, they ought to be obliged to use pure tin exclusively."

The legal aspect of this question is a matter of interest. I quote from Chapter XII. of "Elwell's Medical Jurisprudence": "It is a well-established principle of law that a vender of provisions for domestic use is bound to know that they are sound and wholesome at his peril." Van Brachlin *vs.* Fond, 12 Johnson's Reports, 468. It is equally an elementary principle that in contracts for the sale of provisions, the party, by implication, who sells them, undertakes to guarantee that they are sound and wholesome. (3 Blackstone, 165.) Blackstone also says injuries affecting a man's health are, when, by any unwholesome practices of another a man sustains any apparent damage in his vigor or constitution, as by selling him bad provisions or

wine; by the exercise of a noisome trade or by the neglect or unskillful management of a physician, surgeon or apothecary, these are wrongs or injuries unaccompanied by force, for which there is a remedy in damages by a special action on the case. (3 Chitty Black 91, second.) The action will accrue not against the last vender, when these goods are sold in sealed packages, but against the original manufacturer. This is a point settled by the courts for many years, notwithstanding in the course of trade the goods have passed through many hands and are finally bought and used by one who is injured thereby. The original maker is liable to the person so injured, and not the grocer, who, relying on the correctness of the label, innocently sells the article for what it is not. If, however, that grocer knows that the article is dangerous, or if that knowledge is possessed by any of the parties through whose hands it has passed, if he knows that the article is dangerous, then he cannot evade the responsibility of his unlawful act.

An extremely interesting case bearing on this point was taken to the court of last resort, and is reported in chapter 12 of Elwell's Medical Jurisprudence. The case is Thomas and wife *vs.* Winchester, 2d Selden's Reports New York Court of Appeals, 397. The facts proved in the case were briefly these: Mrs. Thomas being in ill health her physician prescribed for her a dose of dandelion. Her husband purchased for her what was believed to be the medicine prescribed at the store of Dr. Foord, a physician and druggist in Cazenovia, Madison County, where plaintiff resides. A small quantity of the medicine thus purchased was administered to Mrs. Thomas, on whom it produced very alarming effects, such as extreme coldness of surface and extremities, feebleness of circulation, spasms of the muscles, giddiness of the head, dilatation of the pupils of the eyes, and derangement of the mind. She recovered, however, after some time, from its effects, although for a short time her life was thought to be in great danger. The medicine administered was *belladonna*, and not dandelion. The jar from which it was taken was labeled "½ lb. dandelion, from A. Gilbert, 108 John street, New York, jar 8 oz." It was sold for and believed by Dr. Foord to be the extract of dandelion from Jas. S. Aspinwall, a druggist in New York. Aspinwall bought it of defendant, believing it to be such. The defendant was en-

gaged at 108 John street, in the manufacture and sale of certain vegetable extracts for medicinal purposes, and in the purchase and sale of others. The extracts manufactured by him were put up in jars for sale, and those that he purchased were put up by him in like manner. The jars containing extracts manufactured by him, and those containing extracts purchased by him for others were labeled alike. Both were labeled like the jars in question as prepared by Mr. A. Gilbert. Gilbert was a person employed by the defendant at a salary, as an assistant in his business. The jar was labeled in Gilbert's name, because he had previously been engaged in the same business on his own account at 108 John street, and probably because Gilbert's name rendered the article more saleable. The extract contained in the jars sold to Aspinwall and by him to Foord, was not manufactured by the defendant, but was purchased by him from another manufacturer or dealer. The extract of dandelion and the extract of belladona resemble each other in color, consistence, smell and taste, but may, on careful examination, be distinguished the one from the other by those who are well acquainted with the articles. Gilbert's labels were paid for by Winchester and used in his business with his knowledge and consent. The Court of Appeals sustained the principles laid down above in the following words: "The sale of the poisonous article was made to a dealer in drugs, and not to a consumer. The injury, therefore, was not likely to fall on him or his vendee, who was also a dealer, but much more likely to be visited on a remote purchaser, as actually happened. The defendant's negligence put human life in imminent danger; can it be said there was no duty on the part of the defendant to avoid the creation of that danger by the exercise of greater caution, or that the exercise of that caution was a duty only to his immediate vendee, whose life was not endangered? The defendant's duty arose out of the nature of his business, and the dangers to others incident to his mismanagement. Nothing but mischief like that which actually happened could have been expected from sending the poison falsely labeled into the market, and the defendant is justly responsible for the probable consequences of his act."

Not only can the canners be made to respond in damages for the continuance to use this virulent poison in their soldering,

but they can be made to respond in exemplary damages; that is, the jury may not only award the actual damages they determine a party has suffered, but also such a sum as will make an example of those wrong-doers, so as to deter others from this willful tampering with human life. What are the facts of the case? The danger of this muriate of zinc flux is so well known that its use is prohibited by the laws of Maryland. These dangers have been thoroughly exposed by the *Herald* more than a year ago. The trade journals have fully discussed the matter, so they cannot plead ignorance of their danger. Their representative men are here to-night, and these cases are brought to their notice. Safe measures can be adopted instead of dangerous ones. The resin that makes the outside seam tight, will also make the seam on the cap equally safe. When a man uses a dangerous means when he could have used a safe one, and human life is imperiled thereby, he cannot escape the consequences of his act. Those that still believe otherwise would profit by reading the case of Fleet & Semple *vs.* Hollencamp, reported in Chapter 12 of "Elwell's Medical Jurisprudence." The case was taken to the highest court in Kentucky, and exemplary damages sustained through every court and by that of the last resort. In this case Hollencamp had had a prescription of Peruvian bark and snake root put up at Fleet & Semple's drug store, and their clerk carelessly ground up the bark and snake root in a mill in which Spanish flies, or cantharides, had been ground before. The clerk neglecting to clean the mill, the Spanish fly became mixed with plaintiff's prescription, and he taking it, thinking it was the medicine ordered by his physician, received serious harm. The Court of Appeals says: "Whether exemplary damages should or should not be given does not depend on the form of action so much as upon the nature and extent of the injury done and the manner in which it was inflicted, whether by negligence, wantonness, or with or without malice. In these cases, instead of 'caveat emptor,' it should be 'caveat vender.' The excuse that it was accidental or an innocent mistake will not avail him, and he will be liable at the suit of the party injured for damages at the discretion of the jury." In the same decision—in response to the question argued by the attorney for the druggist as to the druggists being insurers—the Court of Appeals said: "We

see no good reason why a vender of drugs should in his business be entitled to a relaxation of the rule which applies to the venders of provisions, which is that the vender undertakes and insures that the article is wholesome. Sound public policy in relation to the preservation of health and even of life would seem to require that this rule should have a rigid and inflexible application in cases similar to the one under consideration." A suggestion was made to me by a manufacturer of a reason why this poisonous amalgam should not be allowed. It is well known that all labor organized has its trades unions. When a dispute arises between the union and employers, if the union cannot carry its measures by fair means they use foul. Malicious mischief is the rule. In his own business, a glass factory, there was a strike; some of the union men refused to strike. He found that he could not walk across the floor without his glassware breaking to pieces; they had dropped something into the glass while the annealing was going on that rendered it so brittle as to be worthless. He mentioned in other trades how the same malicious mischief had been accomplished. Now suppose a strike takes place and malicious mischief is ordered, how easy to drop a teaspoonful of this poisonous muriate of zinc into some of the cans to hurt the proprietor's business. Surely such a virulent poison should not be too handy. It should not be allowed by any State law or tolerated by the manufacturers themselves.

It has been asked what is the use of your trying to effect a change in this form of soldering the caps. The canned goods organization is so powerful that it can override even State legislation, and they instance the bill at Albany this season to prevent canned goods over a year old being sold in this State. I believe that the canners themselves will make the change. History repeats itself. A quarter of a century ago all pickles sold in England were colored by verdigris. It was poisonous; sickness ensued from eating them; prosecution after prosecution was instituted against manufacturers for a violation of the law. By the aid of able lawyers they were enabled to escape. The public began to be demoralized; they were afraid to use the colored pickles and the trade suffered. Cross & Blackwell came to the front. They made an honest, uncolored pickle. Every bottle of pickles sold by them bore the label: "These pickles do not have the fine green color usually seen on

pickles, for that color is produced by verdigris, which is poisonous. These are honest pickles, put up in pure cider vinegar." They trusted the public and the public trusted them, and the enormous fortune they made showed how great was the reward to him who restored public confidence in a necessary article of food. So with the wavering confidence of the public in canned goods. The trade will see to it themselves that confidence is restored or their business is gone. Doubt will kill the business. If a mother dreads when she is putting food before her children that she is giving them poison, then she will no more give them that food than she will give them so much poison. To sum up:

1. These were not cases of sickness from spoiled tomatoes.

2. They were cases of corrosive poisoning from muriate of zinc and muriate of tin.

3. This poisonous amalgam must be abandoned.

4. Exemplary damages, "at the discretion of the jury," will be sustained by the courts for this reckless tampering with human life, in using a dangerous means when a safe one could be used.

5. The canners have only themselves to thank for the present panic in their business, for they have persisted in the use of this dangerous amalgam, knowing it was dangerous.

6. Every cap should be examined, and if two holes are found in it send it at once to the Health Board with the contents and the name of the grocer who sold it.

7. Reject every article of canned food that does not show the line of resin around the edge of the solder on the cap, the same as is seen on the seam at the side of the can.

8. "Standard" or first class goods have not only the name of the factory, but also that of the wholesale house which sells them, on the label. "Seconds" or doubtful or "reprocessed" goods have a "stock label" of some mythical canning house, but do not have the name of any wholesale grocer on them. Reject all goods that do not have the name of the factory and also the name of some wholesale firm on the label.

9. A "swell" or decomposing can of goods can always be detected by pressing in the bottom of the can. A sound can pressed will give a solid feel. When gas from the decomposition of the food is inside the can the tin will rattle by pressing up the bottom as you displace the gas in the can.

10. Reject every can that shows any rust around the cap on the inside of the head of the can. If housewives are educated to these points then muriate of zinc amalgam will become a thing of the past and dealers in "swells" have to seek some other occupation.

DRUNKENNESS IN GREAT BRITAIN.—Two parliamentary returns which have just been published on the motions respectively of Henry Richard and Montague Scott, relative to drunkenness in Wales and Scotland, contain many facts of interest, but it is difficult to see what light they throw upon any disputed question regarding temperance legislation. Mr. Richard's return embraces an account of all the persons proceeded against summarily in the two periods of nine months which ended respectively on June 30, 1882, and June 30, 1883. The disparity between the totals is so trifling that it can hardly be considered other than accidental. The cases were fewer in 1883 than in 1882 by fifty-six only, the totals being 6,517 and 6,461. It is to be noted also that the decrease has been altogether in the rural parts of Wales; the boroughs show an increase of 172 prosecutions, the number in the two periods being 1,288 and 1,460. This increase can hardly be due altogether to extra police vigilance, and it is difficult to escape the conclusion that in town districts, at any rate, temperance is not promoted by a too stringent liquor law. The Scotch return relates only to cases of Sunday drunkenness during the twelve months ended the 29th of September last, and, as Sunday closing is an old institution in Scotland, the most obvious remark which the figures suggest is that even the Forbes Mackenzie law, which has now been in force for thirty years, does not prevent a considerable amount of Sunday drunkenness in the aggregate. The convictions numbered 2,624, and of these all but 255 were in the towns. Glasgow has a bad pre-eminence, with 970 convictions. But Glasgow has over half a million of inhabitants; Greenock has not quite 66,000, and yet returns 226 convictions. Edinburgh records but 242 convictions to a population nearly reaching 230,000, while Leith, with less than 60,000 inhabitants, contributes 121 convictions to the total of 2,369 in the whole of the Scotch burghs. —*London Globe.*

A SHOE THAT WILL NOT PINCH—A SHORT STUDY IN THE HYGIENE OF THE FEET.

By Benjamin Lee, M.D., Ph.D., of Philadelphia.

Comparatively few Amercans walk with their feet. I do not say *on*, but *with*. There is a vast difference. Most of us walk *on* a solidly compressed mass of flesh and bone, about as elastic and pliant as the last on which our shoes are made. A block of wood jointed on at the end of the leg would be exactly as useful; in fact more so, because it would be impossible, by any amount of squeezing, to give it corns. To walk *with* the foot is to allow all its joints free play, and to call into action all its muscles, to allow its skeleton to assume its natural position and relations in every stage of the step, and to avail ourselves of the entire spring given by its beautiful arch. But a small foot is the American's only patent of nobility. It proves his extraction from a race of nobles and kings, which his democratic instincts teach him is a most desirable thing. Hence, he cultivates it as sedulously as a Chinese woman. The result is, a disinclination to walk, great fatigue in walking, a shuffling, inelegant, inelastic gait, and corns, bunions and deformities. The first requisite for the adequate use of the feet, and hence for acquiring an easy, graceful, springy gait and noble carriage, is a properly constructed shoe. When I say that a properly constructed shoe is one which conforms to the natural shape of the human foot, or, in other words, one which is made in accordance with anatomical principles, I am uttering so simple a truism that it may provoke a smile; and yet I venture to assert that not one in ten of those who read this paragraph are thus shod in conformity with nature's demands. The principles which should determine the shape of the shoe were first distinctly enunciated by a distinguished German physician, Prof. Herman Meyer, of the University of Zurich, in a pithy little pamphlet, entitled, "Why the Shoe Pinches."

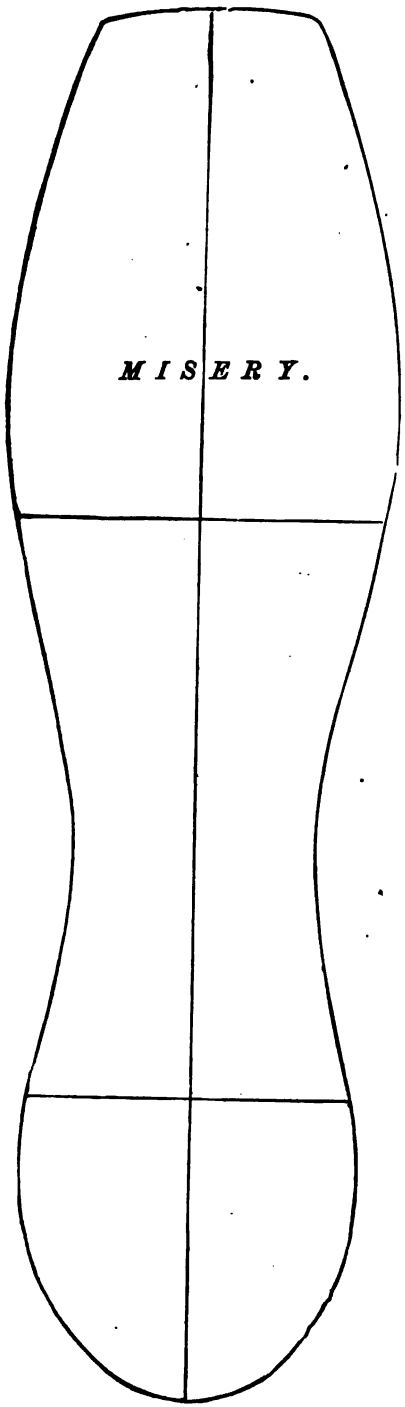


FIG. 1.

I suggest to the American Tract Society the expediency of giving this brochure a wide circulation as a tract, believing that it would do more to discourage the habit of profane swearing than all the essays on the third commandment that have ever issued from its teeming press. Its essential ideas are that the axis of the sole of the foot is a curve, and not a straight line, and that the outline of the inner side of the foot and great toe is a straight line and not a curve, both propositions being directly the reverse of the dogmas of the disciples of St. Crispin and of the French boot-maker.

By the sole of the foot I understand that portion of the naked foot which comes in contact with the ground in walking, and for which it is necessary to provide protection from such contact in the shape of the sole of the shoe. By the axis of the sole I understand a line, starting at the middle of the posterior edge of the heel or *os calcis*, and running forward in the median line of the sole until it terminates at the middle of the toes, which point lies usually between the second and third toes. Now, this line will be found to be straight for

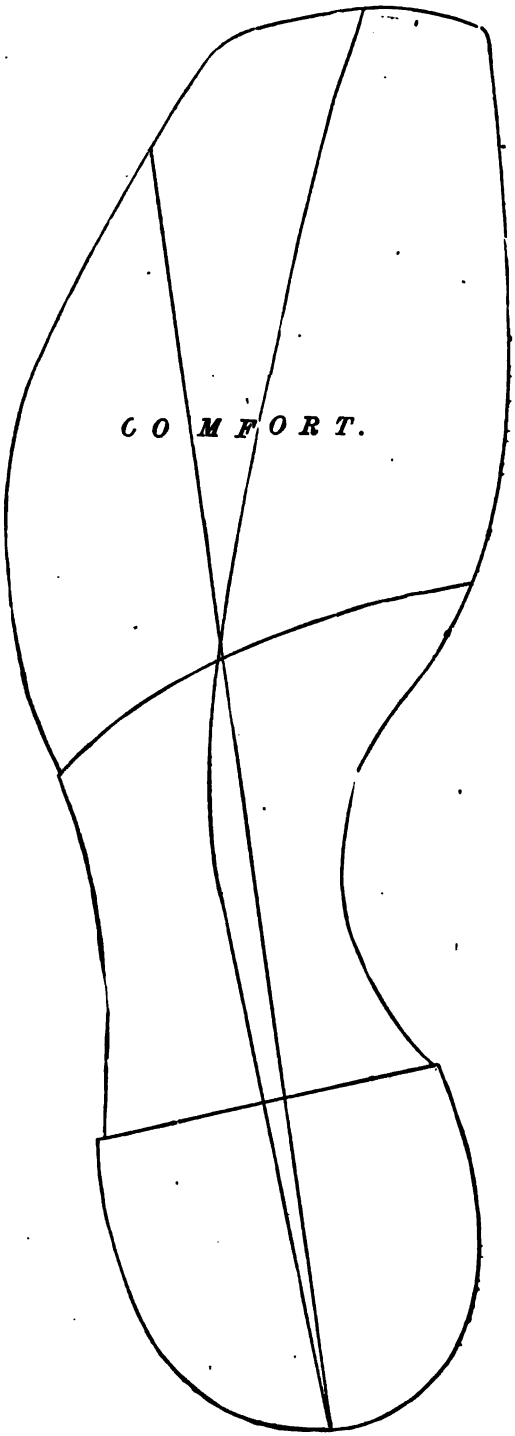


FIG. 2.

little more than the length of the *os calcis;* it then begins to diverge toward the mesial line of the body or inner side of the foot. If continued as a straight line, instead of striking the middle of the foot anteriorly, it will, in the great majority of cases, strike the middle of the little toe. The two diagrams, one with a straight sole—the ideal of the shoemaker, marked MISERY, and the other with a curved sole—the ideal of the anatomist, of the artist, and, I say it with all reverence, of the Creator, marked Comfort, will serve to illustrate better than it is possible by words to convey a correct idea of the respective conditions.

The aim of the shoemaker has been to make each foot symmetrical in itself, while the foot, being a double organ, follows the law of all double organs, and is symmetrical only with its fellow. In carrying out this aim

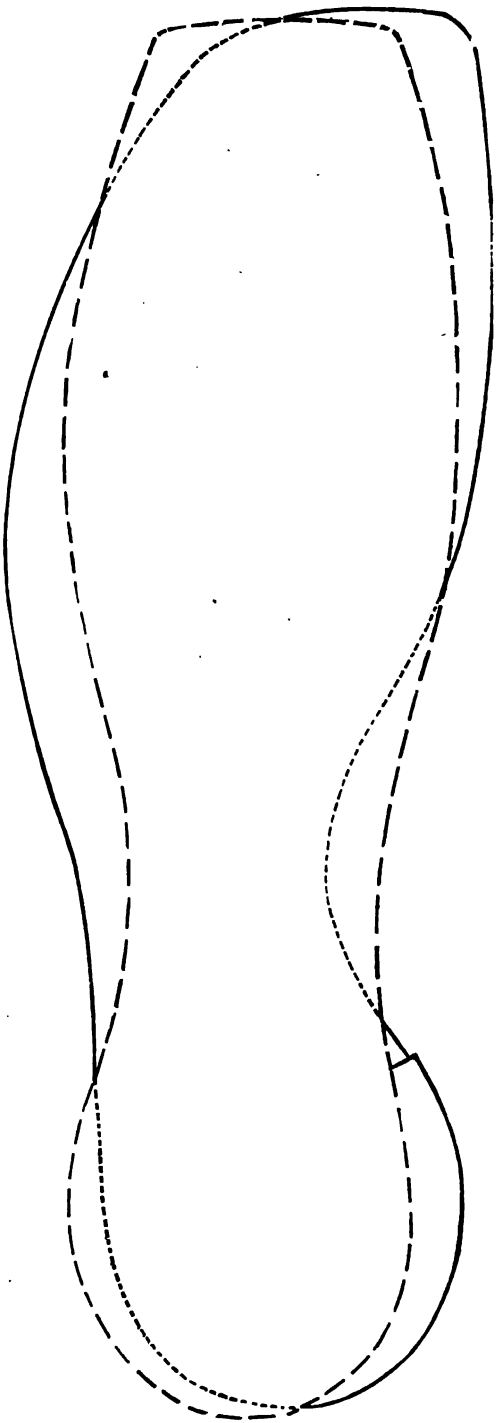


FIG. 2.

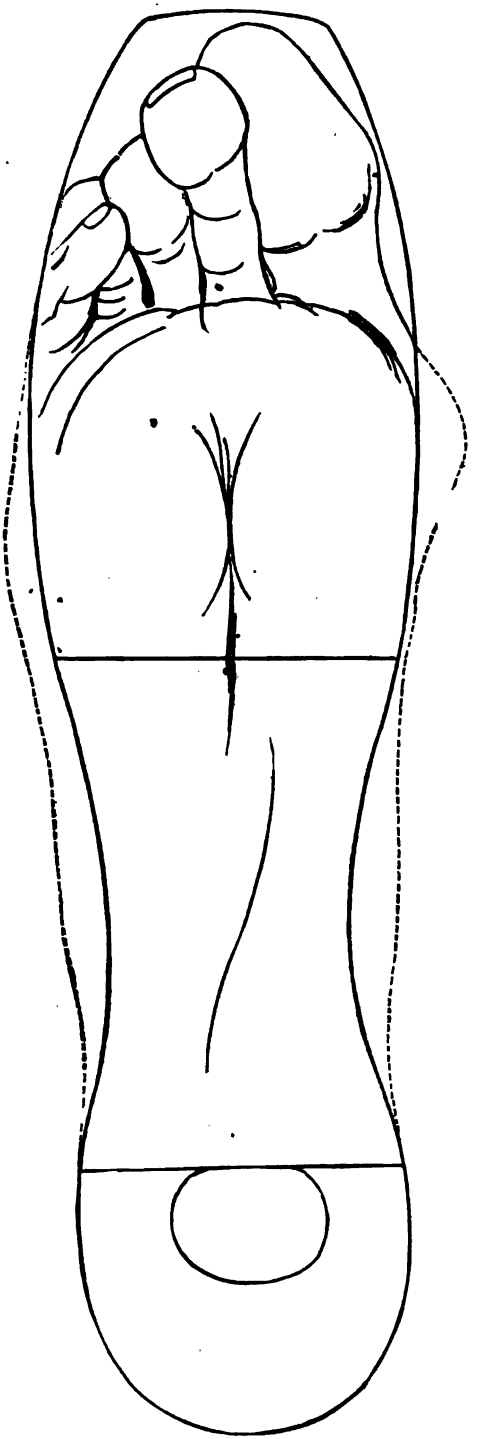


FIG. 4.

he has made the shoe not simply what it should be, a covering for and protection to the foot, but an *orthopædic instrument*, the object of which is to straighten out its natural curve.

A glance at the third diagram will show at what points the pressure is applied in order to produce this result. They are observed to be the inner side of the heel, the outer side of the middle of the foot, and the inner side of the great toe. It will also be noticed that at the same time that strong pressure is brought to bear upon the first or metatarsal joint of the great toe, its distal extremity is forced toward the middle line of the foot; the result of this necessarily is to convert the inner surface of the articular portion of the metatarsal bone into a fulcrum, against which the first phalanx is forced outwards. The articular surface of the phalanx is thus uncovered, and, instead of remaining in contact

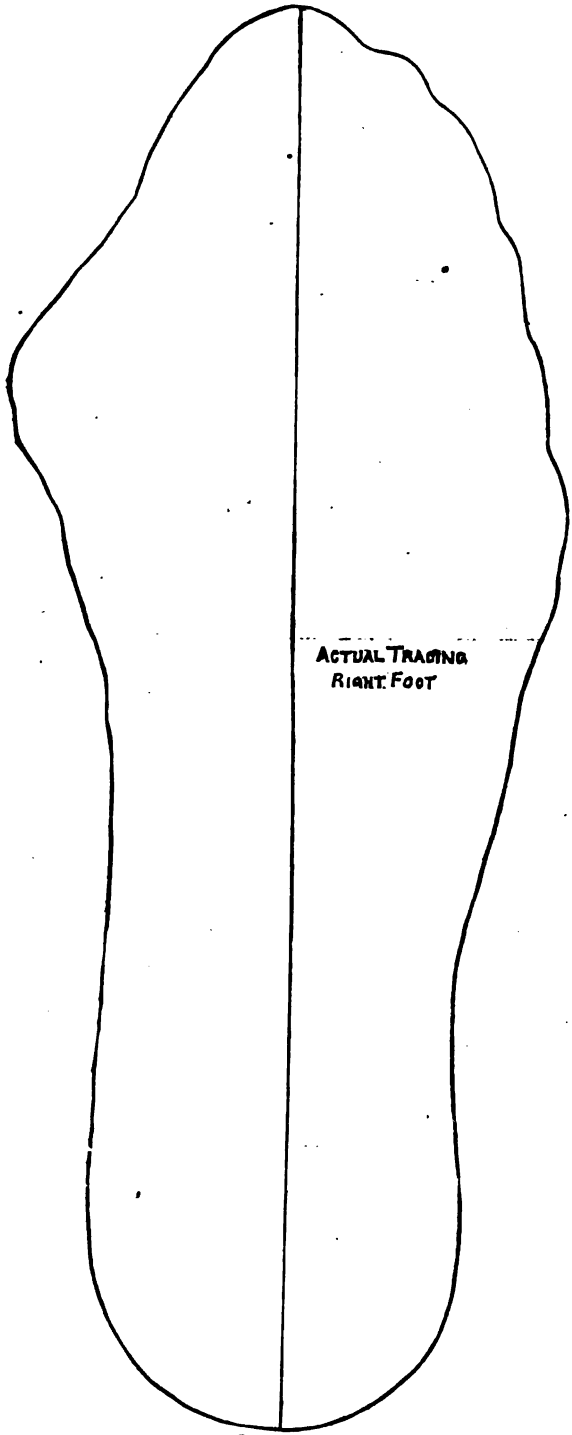


FIG. 5.

with the opposite articulating surface of the metatarsal bone, it is in contact with the shoe, protected only by integument. A provisional bursa is sometimes established, itself often the seat of inflammation; but this does not prevent the sensitive joint surface and the synovial membrane from ultimately receiving injurious pressure, which results in the hideous and painful deformity known as a *bunion*. At the other end of the toe the continued pressure against the matrix of the nail induces a suppurative inflammation of low grade, with fungous granulations, to which the name of *in-growing toe-nail* is given; while the other toes, crowded together and overlapping, are not long in becoming knobbed with corns and callosities. By dint of beginning in early infancy or childhood, as Chinese mothers do, the shoemaker sometimes completely succeeds in his object of straightening out the curve of the foot. The next diagram shows the tracing of an actual foot. Its axis is a straight line from the middle of the heel to the middle of the toes; but at what a fearful cost of years of suffering, as witnessed by this enormous bunion, has the result been obtained. It may well be doubted whether, to use the expressive French phrase, the "game has been worth the candle."

The process of deforming the foot of an American child is usually about as follows: As soon as the victim is able to walk, a pair of straight-soled shoes, rather narrower than the feet, is provided for it. In the course of a few weeks the shoes, being worn the one habitually on the right and the other on the left foot, begin to take the shape of the respective feet. This is no sooner observed by the careful mother than she exclaims: "Why, Johnny! you're wearing your new shoes all out of shape; you must change, and wear them on the other feet." And if Johnny forgets, finding the change by no means conducive to comfort, he is whipped, to aid his memory. It will readily be understood how well adapted these shoes, now conformed to the natural curves of the feet, are to straighten out the curves of the opposite feet. By this simple means, repeated as often as the feet begin to assert their independence, and persistently carried out, it often happens that by the time a child is six years old its great toe will be seriously deflected from the rectilinear position, which it ought to occupy, and the curve of the sole partially straightened. Fortunately, both

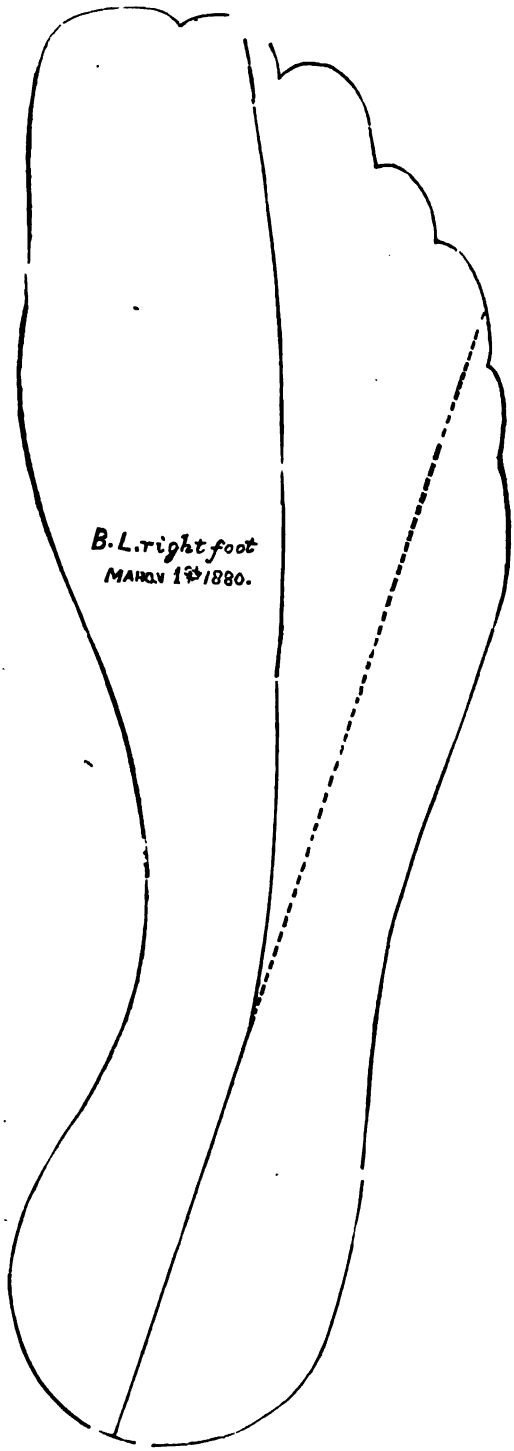
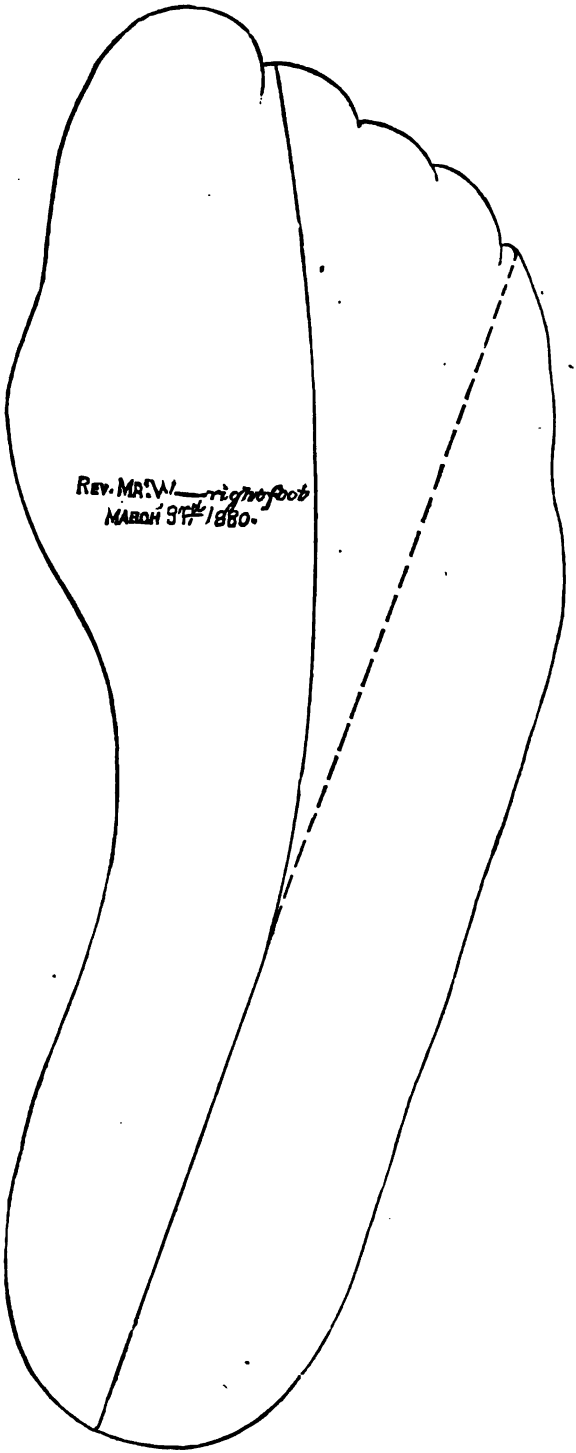


FIG. 6.

lasts and ready-made shoes can now be obtained which approximate quite closely to the natural shape of the foot; and not only can the foot of the child be preserved perfect as it grows up by using such lasts and shoes, but a foot which is already somewhat distorted may even be coaxed back more or less nearly to its original shape. The annexed diagram shows the outline of a foot which, once distorted, has thus been afforded an opportunity of regaining its pristine form.

The diagram on the following page shows the tracing of a tolerably natural foot which I happened to obtain in the following way:

A patient observed the tracing of my own foot lying on my desk. Picking it up, he regarded it mournfully for a moment, heaved a


Rev. Mr. W— right foot
March 31st 1880.

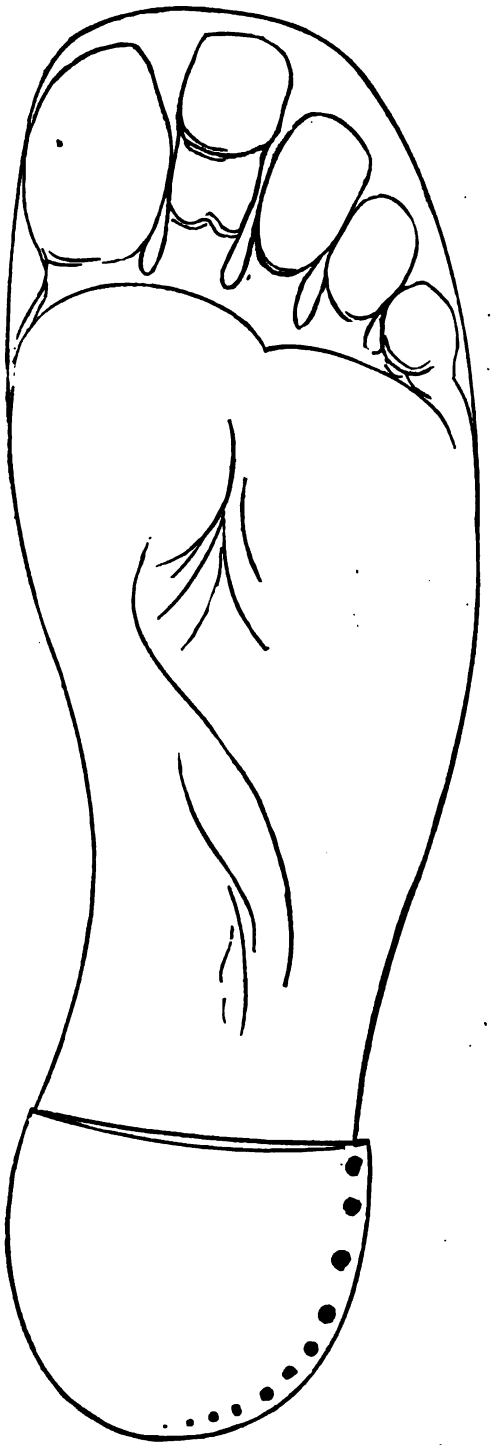


FIG 8.

deep sigh and said: "Ah! doctor, that is just the deformity of my little boy's foot. I must bring him to see you." While expressing my sympathy with his little son's misfortune, I assured him he was in error in supposing that the drawing represented a deformed foot, as it was that of my own, which was tolerably natural.

Finding it was impossible to overcome his credulity on this point, I glanced down at his own feet and noticed that he wore a good, generous broad-soled shoe, which could not have produced much distortion, and said confidently: "I venture to say that your own foot is nearly as crooked as mine." He at once took off his shoe and stocking in order to disprove the truth of my assertion, and this diagram was the result.

The ready-made shoe, to which I have referred as conforming to the principle I have announced, is known as the

"Waukenphast," first introduced under that name in England, but now manufactured quite extensively in New England. It may be obtained of Wanamaker in Philadelphia, and is made of so many different proportions as well as numbers, that almost any foot can be fitted by simply sending the measurements. There are also a number of shoemakers in Philadelphia who have provided themselves with full sets of lasts of this pattern, and make the shoe to order. I may mention in conclusion, for the benefit of those readers of THE SANITARIAN who reside in that city, Mr. Frank Lauer, of No. 130 South Eighth Street, with whom the construction of the shoe in accordance with strict anatomical requirements is really a fine art. Contrast the comfortable, easy, natural position of toes in such a shoe with that of the cramped, distorted, overlapping toes in Fig. 4, and nothing further will be needed in the way of argument.

THE OFFICIAL REPORTS ON THE CHOLERA EPIDEMIC IN EGYPT, 1883.

Reports have now been received by the three Governments, namely, the German, French and British, who sent commissioners to Egypt during the course of last year to make investigations in connection with the late epidemic of cholera. The several commissioners sent out had very different objects in view, and hence the character of their reports necessarily varies very much. The German reports are only of a provisional character, the commission having received permission to continue its studies in India, and being now so engaged in Calcutta.

The first document issued was a brief communication, which was addressed by Surgeon-General Hunter, the British Commissioner, to Sir Edward Malet, on August 6th, 1883, and which only contained some brief account as to the proceedings adopted by the Conseil Supérieur at Cairo, and as to the distribution of the twelve medical officers sent out from England. Next followed Dr. Hunter's preliminary report, which was dispatched from Cairo on August 19th, 1883, and which has only just been supplemented by his final and complete report. The

first report by Dr. Koch, the chief of the German Commission, was issued from Alexandria on September 19th, 1883; this was followed by a second one, dated Suez, November 10th, 1883; and since then a third one has been dispatched from Calcutta on the 16th December. The report of the French Commission, of which Dr. Straus was the chief, was compiled in Paris, and issued on the 12th November. We propose in the present article to give a summary of the matter contained in these several reports, and, as far as possible, to indicate the views which have been expressed by the several Commissions as to the matters with which they have dealt.

I.—REPORTS OF THE GERMAN COMMISSION.

The German Commission was essentially a scientific one; its work was almost exclusively performed in the laboratory, and was micro-pathological in character. The Commission only reached Egypt when the epidemic was on the decline—a period which is the one least adapted to etiological research. Twelve cholera patients and the bodies of ten persons who had died of cholera were, however, utilized for the purposes of the inquiry. It is stated that it soon became evident that the blood was quite free from micro-organisms, but that the excreta contained a significant number, and hence the bowel discharges and vomit were mainly used for inoculation purposes. The dissection of the bodies could always be carried out under specially favorable conditions, namely, a few hours after death, and thus before the onset of changes due to decomposition, which, as a rule, interfere so seriously with microscopic investigations. Not only was the blood found to be free from micro-organisms, but the organs which in other infectious diseases are generally the seat of such organisms were, apart from certain bacteria evidently not connected with the disease, found free from them. On the other hand, the intestines were found to yield important results; for in the case of all recent deaths, certain bacteria were found in the coats of the intestines. The bacteria in question are staff-shaped, and belong to the bacilli; they resemble the bacilli found in cases of glanders. They had penetrated into the intestinal glands, causing considerable irritation, and in many cases they had made their way behind the glandular epithelium and had there multiplied.

The bacilli had also settled in large numbers on the surface of the villi, and had often penetrated their tissue. In the more serious cases these bacilli were in great abundance, and they had passed into the tissues around the glands, making their way into the muscular layer of the intestines. The chief seat of these several changes was found to be the lower part of the small intestine. In referring to this discovery, Dr. Koch states that unless it had been made in connection with perfectly fresh bodies he could not have attached much importance to it, since the influence of putrefaction is liable to bring about very similar conditions; and it was for this reason that no special value was attached to the discovery of the same bacilli in the case of cholera-infected intestines which he had received from India in the previous year. But in view of the Egyptian experience the former discovery, which was made in the case of four different Indian cholera subjects, becomes of considerable value, and all the more so since the possibility of error in connection with putrefactive changes can be set aside. And whilst the bacilli in question were met with in all cases of cholera that were immediately brought under the notice of the Commission for investigation, they were absent in cases in which death took place from some other cause after the cholera symptoms had subsided; hence it is inferred that the bacilli must bear some definite relation to the operation of cholera. But the mere finding of bacilli in the mucous membrane of the intestines cannot be regarded as affording proof that they are the cause of cholera, for it could just as well be supposed that the operation of cholera causes such disturbances in the intestinal coats as would enable certain bacteria already present in the intestines to penetrate them. In short, whether the invasion of bacteria or the operation of the infection is the primary cause, could only be decided by trying to isolate the bacteria from the affected tissues, by propagating them artificially, and then by successfully reproducing disease as the result of inoculation experiments on the lower animals. Unfortunately, such inoculations as had hitherto been possible, and which had been made on rabbits, guinea-pigs, dogs, cats, monkeys, pigs and rats, had been without effect. Thiersch has made the statement that mice fed upon the contents of a cholera intestine suffered from diarrhœa; this has been confirmed by Dr.

Burdon-Sanderson, F.R.S., but it has been disputed by others. Hence, mice were brought from Berlin, and they were inoculated with cholera material. So, also, were some monkeys, dogs and poultry; the monkey being an animal susceptible to at least one human disease, namely, small-pox. But once more all the experiments were without result. The bacilli found in the walls and in the contents of the intestines were also artificially propagated, and with these organisms experiments were made by inoculation and by giving them as food; but although certain septic or putrefactive illnesses were produced as the result of the inoculation, actual cholera could not be induced. The Commission express their conviction that there is abundant evidence to show that the infective matter of cholera must often be contained in the intestines in a powerful form, and they are certain that of the samples employed, many must have contained this material; and hence they suggest either that the animals used were themselves insusceptible of cholera, or that the correct method of inoculating has not yet been discovered. But there is another explanation. It is known that cholera outbreaks subside in localities which still contain many susceptible persons, and hence it may be supposed that towards the end of an epidemic the infective matter loses some of its infective power, or that it is at least much more uncertain of spreading than in the earlier stages. If this be the case with human beings, who are so specially susceptible as regards the poison, it will in all probability be even more so with regard to the lower animals, who, if at all susceptible to its influence, appear to be so only to a limited degree. Whilst, therefore, the Commission feel that as a mere preliminary investigation the inquiry has been satisfactory, especially in so far as it has led to the discovery of characteristic microorganisms in connection with cholera, yet they are convinced that further inquiry must be made, and this under conditions different to those which prevailed at the close of the Egyptian epidemic. They therefore propose in this first report, that the Commission should be directed to continue its work in Bombay, where cholera may be expected to prevail for some considerable time.

The necessary instructions having been obtained to visit Bombay, Dr. Koch, in a second report, dated Suez, November

10th, 1883, and published in the *Deutscher Reichs-Anzeiger* of December 6th, 1883, states that he has learnt that cholera had, contrary to his anticipations, diminished in Bombay, and hence he asks permission to visit Calcutta. He goes on to say that in connection with a fresh case of cholera he had found the same micro-organisms as in the earlier cases, and that he had repeated his inoculation experiments with every modification and care that experience could suggest, but without result. Before leaving Egypt the Commission endeavored to secure evidence as to whether the epidemic had been the result of importation from India, or whether it had arisen there spontaneously. For this purpose Alexandria and Damietta were specially visited, and Dr. Koch proposes to embody the result of his researches on this head in a separate report.

Another very important question the Commission desired to investigate, namely, the effectiveness of quarantine and the probability of the communication of cholera by pilgrims in their journeys to and from Mecca. At this juncture information was received to the effect that cholera had broken out amongst the pilgrims at Mecca, and that orders had, in consequence, been received to the effect that pilgrims coming from Djeddah should undergo quarantine at Tor. With the aid of the Egyptian Government the Commission visited Tor and El Wedj, and it was hoped that from these places they might have been able to proceed southward to Djeddah, and there take vessel to India. But quarantine exigencies interfered with this scheme, a long detention at Djeddah being required. They therefore returned to Suez, making another inspection of the quarantine camp at Tor, and also visiting the quarantine station at Moses' Wells on the journey. These visits are referred to as having been highly instructive. For, on their first visit to Tor, they had inspected the quarantine camp before its occupation, and immediately afterwards a steamer containing 500 passengers arrived at the port near Tor. The medical officer on board is reported to have declared all passengers to be healthy; but when they were landed several pilgrims were suspected to be suffering from cholera, and they were hence confined in the lazzaretto. On the second visit of the Commission to Tor they found that a second vessel had arrived, that the pilgrims had been landed, and that in both camps cholera had

broken out. On the details of this story much depends, and when the special report of the Commission as to this matter is received, it will doubtless supply further information on the subject, as also on the general question of the quarantine stations maintained in the Red Sea. The Commission having had some further experience of quarantine operations by being subjected at Suez to a so-called process of disinfection, were allowed to proceed to India.

From Calcutta another report was dispatched on the 16th December. The Commission had only arrived there on the 11th, and hence this report contains no additional information as to their labors. It gives some details of their journey; it explains how readily and courteously arrangements were made by the Surgeon-General with the Government of India to enable them to fit up a laboratory, and to carry on their investigations in connection with the hospital attached to the Medical College; and it then enumerates the objects which the Commission had decided to investigate. These include microscopic work similar to that carried out in Egypt; investigations as to the communication of cholera to the lower animals; cultivation of bacilli for inoculation and other purposes; inquiries as to the influence of soil, water and air in connection with the origin and spread of cholera; and lastly, general investigations of the special circumstances attending outbreaks of cholera amongst the various populations, including the troops, prisoners, &c., and of the regulations in force with a view to the prevention of its spread.

II.—REPORT OF THE FRENCH COMMISSION.

The investigations carried out by the French Commission very much resembled in character those of the German Commission. They consisted essentially of a pathological inquiry directed to the discovery of the cause of cholera. This Commission consisted of Drs. Straus, Roux, Nocard, and the late Dr. Thuillier, who lost his life from cholera during the course of his labors in Egypt. When the commission reached Egypt the mortality in Alexandria had reached its highest point; but the epidemic had ceased in Cairo. Like their German *confrères*, the French Commission refer to the fact that they were able to make their autopsies on the bodies of patients who had

only just died, and that they were thus able to avoid many of the difficulties arising from putrefactive changes. They sought to ascertain whether any special micro-organism was associated with cholera; and to reproduce the disease in the lower animals as the result of inoculations with morbid products, and also with any organism which could be isolated and cultivated for that purpose. In the contents of the intestines the microscope revealed a large number of organisms of different varieties, bacteria of different sizes, and micrococci, isolated or joined together as zooglœa. The material vomited afforded similar results, but no one organism could be identified as special to the disease. Numerous examinations were made of sections of different parts of the intestinal canal, and some account is given of the various micro-organisms discovered. One of the most frequent forms was that of a bacillus, evidently corresponding with the special one described by Dr. Koch, and in a foot-note the Commission consider that this must be the one which the German Commission have sought specially to identify with cholera. But reviewing all the information obtained in connection with their microscopic observations, the Commission, whilst affirming that no mere post-mortem changes were in question, consider that the mere variety of organisms detected in the sections should of itself raise a strong suspicion that the invasion of the intestine was a secondary matter. The fact that one definite organism was often found in the intestine in exceptional abundance, in their opinion only goes to show that it meets, in the intestine of cholera patients, with exceptional opportunities for its propagation. If, they say, there really existed between cholera and this organism, which is found in the intestinal coats, and the cholera disease, the relation of effect and cause, then the organisms ought to be found in the bodies of all cholera patients. This, however, was not the case; for even in three sudden and acute attacks, in which the bodies were examined within from ten to twenty hours, no micro-organisms were appreciable in the walls of the intestines, and yet it might have been supposed that these were precisely the cases in which the presence of the special organism would have been most obvious.

An account is next given as to the condition of the blood in the cases of cholera met with, and of certain experiments

which appeared to indicate that under special conditions of temperature a certain micro-organism was cultivated in that fluid, the process being most obvious in the lower layers in the tubes used, that is to say, precisely where the action of the external air was least likely to influence the result. But on endeavoring to cultivate this body in various media, such as infusion of fowl or veal, urine, blood-serum from an ox, and even in the blood of rabbits and of cholera patients, no definite result could be obtained. This failure, however, in no way interferes with the belief expressed, that it is in connection with experiments on the blood that the most is to be hoped for in the future, and that there are strong grounds for believing that the blood of cholera patients is invaded by a definite organism. In this opinion the French Commission are thus at variance with the German one.

Experiments were also made by feeding such animals as chickens, pigeons, quails, a turkey, a jay, rabbits, guinea-pigs, rats, mice, dogs and cats with cholera vomit and excreta. Pigs, also, were made on several occasions to eat parts of cholera intestines, as well as cholera discharges, and this after their own intestinal canal had been irritated by a purgative. But neither cholera nor any other disease was induced as the result. In one instance a chicken did die three days after having partaken of rice-water evacuations, and both the contents of its intestines and the post-mortem appearances made the Commission hope that they had been successful in inducing cholera. But portions of this bird's intestines were eaten by other chickens, and the blood of the affected chicken was used for inoculation purposes without producing any effect whatever. In short, whether the cholera matters were given to young or old animals, whether they were administered fresh or after being kept for several days, and dried, either in the air or in carbonic acid, no result was effected. Even the inoculation of large quantities of cholera blood into the veins, or into the cellular tissue, was comparatively harmless. The Commission believe that they have cleared away many sources of error, and removed difficulties which might have been a hindrance to future observers, but they cannot pretend to have done much towards solving the problem as to the etiology of cholera.

III.—REPORTS OF THE BRITISH COMMISSIONER.

The reports presented to the Foreign Office by Surgeon-General Hunter (now Sir William Guyer Hunter, M.D.) are three in number. The first was addressed from Cairo on the 6th of August, 1883, and it is a mere preliminary communication. The second was dispatched on the 19th of the same month, and though the information then obtained was by no means complete, the contents of the document gave a very clear indication of the views which Dr. Hunter had already formed, and which his later report went to amplify. After giving some description of the foul state of the Nile, of the cemeteries, and of some of the hospitals, Dr. Hunter proceeds to explain that for some time previous to starting on his tour of inquiry in Egypt his thoughts had frequently taken a direction somewhat as follows: "This country has been visited by five epidemics of cholera since that of 1831, namely, in 1848, 1850, 1855, 1865 and 1883. Diarrhœa is very common and fatal, and conditions for the development and spread of endemic and epidemic disease abound everywhere. What is this disease which is here called 'diarrhœa,' and is so fatal?" With his mind admittedly possessed by thoughts such as these, Dr. Hunter began to make cautious inquiries from medical men and others, and he alleges that as the result he found that cases of "cholerine" were not unknown, and that they had been seen from time to time by one and another person. A summary of the information which was received from various sources is given, and then Dr. Hunter proceeds, even at that early date, to express what practically becomes the final opinion which he addresses to the Foreign Office. "These facts," he says, "are very significant, and of the first importance. They lead to the conclusion that cholera, be it called by whatever name it may, as Asiatic, epidemic, sporadic, cholera nostras, cholerine, &c., has existed in Egypt for some time past, and that in many instances the diarrhœa, which is so common and deadly, is but a form of cholera."

Some of the information on which he based the view, that the epidemic of cholera, instead of being due to importation, was only the sudden development of a poison which had existed in Egypt off and on ever since the epidemic of 1865, was included in the August report. A further report was, how-

ever, sent in on December 11th, 1883, and adverting to the opinion already expressed, Dr. Hunter proceeds to give further information on the same subject, quoting the opinion of a number of persons, and he then states that the aggregate of the information obtained leads to the conclusion that cholera was endemic in Egypt before the recent outbreak. Very great importance necessarily attaches, under these circumstances, to the character of the evidence which he obtained, and to the sources from whence it was derived, and we propose, therefore, to refer to this part of the report in some detail.

The first communication on this subject is contained in a letter which Dr. Sierra addressed to Dr. Sonsino, in answer to a question from the latter. Dr. Sierra commences by explaining that he is obliged to trust entirely to memory. He says that in the season of watermelons gastric disorder is very frequent, but that he has not considered this to be cholerine. He, however, remembers such a case in the person of a Jewess; and he states that he had been told that some cases—never more than two or three a year—had occurred in Alexandria. But he adds that he personally "never saw any cases of sporadic cholera, cholera nostras." Hen then goes on to give the opinion of certain hospital sisters who believed they had met with choleraic symptoms, but for his own part he does not think that the existence of cases of cholerine can be a sufficient reason for those who study epidemiology to admit on that account that the present epidemic arose in Egypt. In short, he desires to make it clear that he is not in a position to attempt the solution of the difficult problem in question, not having the necessary knowledge of the places and the opportunity to make the needed investigations.

The next communication is one from Dr. Dutrieux, who visited Damietta about the middle of August, to Chérif Pasha. As the result of this visit he supplies information as to five groups of cases. The first related to two children, who, in the preceding April, suffered from "cyanosis," with cold skin and aphonia, but without vomiting or diarrhœa. The next had reference to a child who, early in May, suffered from vomiting, cramp, cold skin and aphonia, without diarrhœa; this case proved fatal. The third was a single person, who was attacked towards the end of April, and who is stated to have died "of

vomiting and diarrhæa." The fourth was an almost similar case. And lastly, a M. Patrino told him that two Greek women were ill for two days early in May of vomiting and diarrhœa, but that they recovered. On this slender evidence as to cases, none of which he had seen himself, Dr. Dutrieux goes on to say: "I hold that these facts prove that cholera existed at Damietta as early as the end of April;" and he finds it sufficient to enable him to make the following deductions: "(1) The cholera which became epidemic at Damietta on the 22d June was not imported thither. (2) Cholera centres existed long before the 22d June in several places in Lower Egypt. (3) The cholera epidemic raging in Egypt is not Asiatic cholera, but a local cholera."

A further communication from Dr. Sierra follows. It relates two cases of which he got information through the hospital books at Alexandria, and from the hospital sisters. One is the case of an old man 70 years of age, who suffered from vomiting, diarrhœa and loss of voice early in June, 1882, but who made a rapid and good recovery. The next was the case of an Italian, who, after eating "a great quantity of beans," was admitted in a cold and collapsed state, with no pulse or voice, together with diarrhœa, vomiting and stoppage of urine. The case, which terminated fatally, was regarded as one of "endemic cholera," with probable invagination of the intestine; there was, however, no post-mortem examination.

Dr. Mackie next addresses Dr. Hunter, and he gives four instances of what he calls "choleraic cases;" one in 1872, another in the summer of the next year, and two in 1882; and, so far as his memory serves him, these are all the cases of the sort that have come under his notice. Dr. Mackie, however, encloses certain information received from others. Thus, Dr. Kartulis, writing from Alexandria, gives the case of a young man who, after his return from a shooting expedition, suffered from diarrhœa, vomiting, inability to pass water, and cold perspiration. The stools are stated to have been of a watery, light, rose-colored appearance, and the vomit of a light green color. "The case," adds Dr. Kartulis, "I hold as one of pernicious fever." Dr. Mamlouk also addresses Dr. Mackie. He describes first a very similar case to that of Dr. Kartulis; he speaks of it as "a regular intermittent tertiary fever," and says

it occurred some eight years ago. His next and last case occurred some few years since, the patient being a lady who suffered from severe diarrhœa and vomiting, accompanied by loss of voice, algidity, stoppage of urine, abundant perspirations, cyanosis, cramp in the stomach and legs, and burning thirst; the diarrhœa was not, however, of the "rice-water" character. Dr. Mackie's next correspondent is Dr. de Castro, who, having had much experience of cholera in 1866, expresses the opinion that he saw a single case of cholera in Alexandria some six or seven years ago, another about three years ago, a third about two years ago, and a fourth case in September, 1882. He gives no symptoms whatever as regards the first three cases, and of the fourth we learn that there was vomiting, diarrhœa, cramps and collapse. But, says Dr. de Castro, "I looked upon these cases as sporadic, and of but little importance. In view of the circumstances in which they occurred, I was perfectly sure that the disease would not propagate itself;" and he adds significantly in his reference to the late epidemic: "Far otherwise did I consider the first cases at Damietta." He next proceeds to explain that the cases he has enumerated are but instances resembling those which are met with in the great cities of Europe, but that they differ from Asiatic cholera in that they are less fatal, and that, notwithstanding an absence of all hygienic precautions, they have no tendency to propagate themselves. Dr. Demech, in a letter to Dr. Mackie, explains that cholera prevailed in the Soudan in 1872, when it reached Korosko (Lower Nubia), but that it did not extend to Egypt. He further adds that every summer he had met with cases of cholera nostras in Alexandria. Dr. Fouquet supplies similar information as to a summer cholera, but he adds that the cases were so different from Asiatic cholera as to make any mistake impossible. Thus far, the cases as to which Surgeon-General Hunter was able to get information from one and another source, went to show that at odd times certain isolated cases of a disease having different names, but very much resembling what is known as sporadic cholera, had occurred in Egypt; several of his informants taking care to explain that they were nothing more than is often met with elsewhere where cholera is never regarded as being endemic, and some distinctly denying that the disease was in any way related to Asiatic cholera.

The next evidence is of a different character. Dr. Haddad, writing from Assiout directly to Dr. Hunter, gives information as to disease which had prevailed in the year 1883, at an earlier date than the outbreak at Damietta, which has generally been regarded as the place at which cholera first made its appearance. Ever since the month of May Dr. Haddad had observed that a profuse diarrhœa was prevalent in Assiout, the evacuations often having been observed to be watery, and to exhibit the character of rice-water. This disease was maintained into the month of June, some attacks being associated with cramps, coldness of extremities and blueness of the face; cases of the latter description at times terminating fatally. About the 20th of June the number of attacks became more frequent, although the disease was not more severe in its type; but it prevailed amongst the people generally, and attacked some of the upper classes. This was before the date of any of the cases recorded as occurring at Damietta, and hence the Assiout cases cannot be regarded as having been due to importation from that place. Even in May, out of a total of 120 deaths from all causes, thirty-nine were registered as due to catarrh, either of the stomach or the intestines, to diarrhœa or to dysentery; and in June, out of a total of 116 deaths, thirty-seven were recorded as due to similar affections. This diarrhœal mortality is not high, but in this connection it is noteworthy that even when later on unmistakable cholera was prevalent in Assiout, the proportion of deaths to attacks was very low. Dr. Haddad is convinced that cholera was not imported into Assiout from Lower Egypt in 1883; and regarding the earlier cases recorded as of the same type as the genuine cholera which followed, he says he had no means of ascertaining how long that disease had existed there.

Dr. C. J. Macnally, dealing with the same questions as to the origin of the epidemic at Damietta, quotes some information which unfortunately had to be procured through third parties, who at times were without any medical or scientific training, to the effect that a Dr. Tsamis, of Shibin-al-Kom, had informed his brother at Zagazig that a large mortality from cholera had prevailed in that place before the Damietta attack, and Dr. Tsamis, of Zagazig, is reported to have heard of a similar mortality in the villages round that town. Greek mer-

chants, too, are quoted who declare that in two villages near Zagazig as many as 200 persons died of diarrhœa and vomiting in January, 1883.

A few other communications are appended to Dr. Hunter's report, but they are much after the style of those previously adverted to. Thus, Dr. Patterson, of the British Consular Hospital, at Constantinople, having read a previous report of Dr. Hunter's, writes to confirm his statements, and to express belief as to the "probable correctness of the inferences" he had drawn. He believes that a form of cholera, by whatever name it may have been designated, has been endemic in Egypt, no year having passed without well-marked cases of "endemic cholera" with rice-water purging, vomiting, cramps, leaden hue of skin, cold clammy perspiration, pinched features, swollen eyes, and the characteristic dark areolæ, husky voice; pronounced collapse, and perfect intelligence, followed in non-fatal cases by reactionary fever. He expresses no opinion of the infective or communicable properties of Asiatic cholera, but, as the result of much experience, he says he has been forced to the conclusion that local conditions of filth, such as have been described in Surgeon-General Hunter's report, do produce a form of disease so similar in all characters and symptoms to Asiatic cholera as not to be, in practice, distinguished from it. One other letter, from Dr. Rabitsch, of Cairo, enters into details as to a single case very much resembling those that have already been described, and this he regarded as cholera. The case took place in the summer either of 1878 or 1879, but there being no epidemic present, Dr. Rabitsch took the opportunity of assuring his assistants that no spread need be anticipated.

This concludes the correspondence which Dr. Hunter brings forward in support of the views which he has expressed. But in the main body of the report he further quotes an official, apparently not a medical man, who is stated to enjoy a high position under the Egyptian Government, and who is reported as having said to Sir Evelyn Baring: "We all know that cholera has been constant here, and generally follows the cattle plague, but we are told to say nothing about it." Dr. Hunter then proceeds to sum up this portion of his report by declaring that the evidence referred to satisfactorily proves to him "that

cholera has existed in Egypt in an endemic form since the epidemic of 1865, and probably anterior to that period." The epidemic of 1883 "was, consequently, the outcome of the disease which existed endemically in the country."

In determining the precise meaning which should be put upon Dr. Hunter's conclusion as to cholera being endemic in Egypt, and as to the relation of the genuine cases of the disease which occurred during the epidemic in the summer and autumn of 1883, with the diarrhœal attacks to which the communications he had received refer, some assistance is afforded by a passage in which he expresses his concurrence with Dr. de Castro, where the latter alleges that if the cases which had come under his notice were really cases of cholera, then cholera exists in many of the large cities of Europe. As to this, Dr. Hunter says: "I feel very little doubt that examples of cholera are not of unfrequent occurrence in many of the cities and towns of Europe, not excluding the British Isles." It would thus appear that, according to Dr. Hunter, the cases of English cholera which occur in England every year, and especially in our large centres of population, ought to be regarded as capable of bearing the same relation to cholera, should it appear in our midst, as was the case as regards the groups of diarrhœal disease in Egypt which preceded the recognized cholera epidemic in that country.

Dr. Hunter next proceeds to discuss the scientific aspect of the question. He does not profess to be a scientific expert himself, and he made no investigations into this part of the subject, preferring to seek support for his views mainly in the well-known reports prepared by Drs. Lewis and Cunningham, and addressed to the Sanitary Commissioner with the Government of India. Taking the negative results hitherto obtained by these observers as bringing the information on the subject of micro-organisms in connection with cholera up to current date, he refers to the French and the German Commission, and then, dealing with the question of the existence of a cholera contagion, he finds himself able to declare emphatically that it "has no existence." As regards the important subject of the origin of cholera in Egypt, the report appears to us to have been prepared under the influence of a very strong antecedent personal bias in favor of the views which it has ended in form-

ulating; views which do not seem to have been at all modified by the very imperfect nature of the only evidence which could be procured, or by the total absence of any scientific experiments. Commenced with a "mind possessed by thoughts" which had been formed "previous to starting" on the tour of inquiry; views already developed did not fail to find sufficient support in evidence of the sort we have quoted. Apart from the information supplied by Dr. Haddad, of Assiout, which may be regarded as tending only to show that Damietta was not the first place attacked, the general body of evidence contained in the report does not seem to us to be of a character such as should suffice for the formation of an opinion so entirely at variance with the views of other competent observers who have spent long years in carrying out personal inquiries, and who have endeavored to avoid forming opinions on hearsay evidence alone. Although we are grateful for every installment of information and experience on so important a subject as is involved in the matter which has been under discussion, we cannot regard the question—whether cholera has or has not been endemic in Egypt—as one which is by any means settled.—Abstract from *The Practitioner*, London.

SEWERS AS LIFE PROTECTORS.*

Sewers are a recognized necessity in a modern city, and their chief office is to carry off the impurities generated within the houses—especially within dwellings. This filth, called *sewage*, if left to rot in the houses or on the premises near, is so very poisonous and productive of death that its removal in some way is a necessity for the health and prosperity of every city. Because of this necessity sewers are built and maintained at public expense, and continue under official supervision and control.

But an essential part of the sewer system of any city enters the houses, and in most modern houses becomes a part of their

* Abstract of letter of Prof. Wm. H. Brewer, President of the Board of Health of New Haven, Conn., addressed to the Common Council, March 22, 1884.

construction. If this plumbing and house-draining is badly done, it becomes a curse instead of a blessing; instead of purifying the house, it poisons it, and instead of promoting health, it brings disease and death. Plumbing and house-drainage is an integral part of the sewer system, and as such it should be as truly under a general official supervision as the sewers themselves. Many, and perhaps most large cities, now have plumbing and house-drainage ordinances, and proper officials to attend to this business. In the experience of this board we have frequent and ample proof that such action is sadly needed here, and as a board, or through its members and officers, have often asked for it, as our printed reports for the last nine years show. Not a year passes that we do not see lives lost because of the lack of such regulation, which lives we believe might have been saved.

Plumbing and house-draining should be as truly a matter for official inspection and control, both as to the plan and the honesty of the work, as the storage of ashes or the material and thickness of walls. There is the same necessity for such laws as for fire laws.

The ashes on our premises must be kept according to certain legal restrictions; public officials enter our houses to see that the law is obeyed, and our own and our neighbors' property not thus endangered by fire; but there is a hundred times as much loss caused by sickness from bad house-drainage as from fire from faulty ash-bins. For the public safety, we have ordinances directing that the walls of buildings shall be of suitable material and strength; we have no law controlling house-drainage, although a hundred lives are lost in our city because of faulty drainage to one because of faulty walls.

Suppose that a tenement house in this city was on fire, its inmates in danger, and the physical means of saving their lives were simple and at hand, but the firemen had neither the legal right nor the legal power to use them. If but a single life was lost, laws would soon be made to suit similar emergencies in the future. Or suppose the firemen were legally prevented from using such methods as they knew had been effective elsewhere, and the victims left to helplessly perish, how long would it be before the cruel laws would be repealed?

Yet every year we see many lives lost, not only in tenement

houses, but also in the houses of well-to-do citizens, from diseases induced or aggravated by bad plumbing, faulty drainage, or other preventable causes, which lives might have been saved were the people as wise and alert in sanitary matters as in that of fire, and public opinion as earnest in maintaining organized protection against the one class of dangers as against the other.

Within the past year the proper city authorities, directed by law (and sustained by public opinion), have compelled the extensive erection of fire-escapes on many buildings, often at a considerable cost to the owners, although (so far as I can learn) there has never yet in this city been a single life lost at fires where the victim was not at fault and a fire-escape on the building would have saved the life.

But every year lives are lost that might have been saved by even less official care and private expense than the cost of the fire-escapes, if rightly directed towards the sanitary appliances, some of them in the very buildings on which the law (and popular demand) has compelled these fire-escapes to be placed. Now that we have the one protection, let us have the other.

The landlord of the tenement house is compelled, by law, to guard against certain dangers to the lives of his tenants from the occasional and accidental fire; but the law still allows the landlord to constantly endanger the life of the same tenant in that same house by such unsanitary conditions that he is sometimes killed as the natural result of such conditions, a remedy for which is as well understood and no more expensive than the remedies against dangers from fire. We want the authority and means to use these remedies.

Owners of theatres and other places where people congregate are now compelled by law to provide ample means for persons to get out quickly if they even think they are in danger; but these same owners (if they so choose) can, within those same buildings, legally maintain conditions which cause a thousand times as many deaths in the country as panics.

We now want some of the legal safeguards erected against the danger of slow death by preventable disease, which are already provided against sudden death by accident. We have guarded against the lesser causes of preventable death, now let us be equally earnest and enthusiastic in guarding against

the greater danger—that from accumulated and accumulating filth.

We want a plumbing and house-drainage law, with the means of administering it.

A person is now prevented by law (and public sentiment sustains the law) from putting up wooden structures within fire limits, where such structures may endanger the property and peace of neighbors; but the law allows (although public sentiment condemns) this same person to build a privy near his neighbor's windows and poison the air those neighbors must breathe, and to sink a cesspool where it may poison his neighbors' soil and pollute their wells. He may not legally endanger the safety of his neighbor's house and depreciate its value by building a wooden structure near it, no matter how clean that structure may be; but he may depreciate the value of the property of all his neighbors, and endanger their health, and even life, by poisoning the air and soil and water of the neighborhood with privies and cesspools.

We want a law forbidding the building of any privies or cesspools on sewered streets.

Our city is reasonably prosperous, and real estate is rising in value, more particularly in those wards where the death-rate is the lowest. Houses and homes are in the most demand in those localities deemed most healthy. It is the duty of the Board of Health to wage war against all forms of filth in the city, and to give such aid in this matter as is possible to those who are afflicted with untidy neighbors. We pray that your honorable body will co-operate with us in this, and *help us abolish the numerous hog-pens within the city limits.*

Many observers have called attention to the fact that several indications suggest that this will be a "cholera year." I think that public opinion now demands each of the three specific enactments asked for, and if we wait to be scared into it by the actual advent of cholera or other pestilential disease, the people will justly blame the authorities they have chosen to watch over their interests. Each of these asked-for enactments has now been delayed longer than has been either wise or for the best interests of the city.

INTERNATIONAL SANITARY CONFERENCES IN THEIR COMMERCIAL RELATIONS—QUARANTINE.*

Quarantine, it is true, has been abused, but life is dear, and when people see themselves and their families likely to be stricken down by a disease which has all the terrors of the dagger in the hands of the assassin, they naturally look somewhere for protection. They do not *always* weigh the value of the remedy when they are in danger. They see the effects of the disease; men fall around them, stricken down by an invisible foe; the corpses are, like the slain on the field of battle, unburied, because there are few who are willing to perform the last act of humanity in their behalf. The cause of all this havoc is unseen, and little is known of it except the name and the effects. In this case it may be truly said: "Causa latet, vis est notissima."

The more this subject is considered the more perplexing does it become. Conventions have been called for the purpose of discussing the best means to be employed for removing the difficulty, but there are always conflicting interests to interfere. Countries remote from danger do not want restrictions placed on commerce; those more exposed are clamorous for protection. There is so much discussion, so much argument, so much special pleading, so many objections on immaterial points, that it may easily be seen that the fundamental difficulties are of such a character that they cannot easily be reconciled. "Quot homines tot sententiæ" is the rule, and the most discouraging feature arising out of these differences is, that no one seems willing to make the least concession.

For the purpose of reconciling these conflicting interests four international conferences have been held in Europe and one in the United States, in 1880, and four national sanitary and quarantine conventions in the United States, the last of which was held in Boston in 1860. The report of the committee on quarantine regulations, of which Dr. A. N. Bell was chairman, states in the clearest possible terms the very essence of the

* Concluded from p. 434.

principles involved, and so much discussed in the international conventions which have been held:

"That the adoption by commercial nations of a sound and well-digested code of marine hygiene, and of the necessary measures for insuring its strict enforcement, would tend greatly to alleviate the evils of the present system of quarantine, and promote the comfort of passengers and crew."

It would not be far from the truth to state that it was never the intention of some of the governments in entering the conferences to accept any such measures. In commenting on the invitation of Count Andrassy to the different European Powers to meet in convention in Vienna, M. Fauville says: "The note omits to say what States have been invited to assemble, and yet it is very important to know that, for on the composition of the conference will depend the resolutions to be adopted.

"It is evident, for example, that if all the States of Europe take part in it, the results of the vote will be very different from what would follow if only the States bordering on the Mediterranean were to meet. The reason is very simple—because the interests of the south of Europe are very different, in a commercial and sanitary point of view, from those of the north, and they could not, in consequence, act in concert in a convention in which these questions would be at issue.

"Thus it is evident the States of the north would place their commercial interests in the first rank, whilst in those of the south sanitary measures would prevail.

"Therefore, if an agreement be desirable, it is necessary to separate, so far as regards the convention, the interests of the north of Europe from those of the south.

"The silence on this point observed in the dispatch from the Austrian Government leads to the inference that the distinction has not been observed, and that all the States have been invited to assemble. That being the case, it may be predicted that an agreement in the conference is impossible, unless the separation referred to is effected; but even in this case the probability of an agreement will be extremely problematical.

"This may be inferred from the results of previous conferences."

This prediction was fulfilled to the letter, as will be seen, for the conference, although eight months in session, separated

without accomplishing the purpose for which it was convened.

In 1831 cholera first visited Europe. England was then governed by the severe quarantine laws established in 1666 against the plague, which well nigh left London a desert, and France was under the stringent rules adopted in 1822, against the plague, which was frequently introduced from the African countries bordering on the Mediterranean. A careful study of the practical results of these stringent measures of quarantine, together with a clearer and more comprehensive view of hygiene and preventive medicine, led gradually to a modification of opinions regarding the means of protection generally adopted.

France has had many able and enlightened workers in the cause of reform, but none, perhaps, who deserve more from the people than Chervin; because he was the first to champion a radical and unpopular reform. He was, in 1830, striving for a reform in the quarantine laws against yellow fever in the French colonies, and was among the first to perceive that the most stringent regulations were comparatively useless against cholera as well as against other contagious diseases, unless supplemented by other necessary conditions. As before stated, there is always a conflict between science and commercial interests in these cases. The conquest of Algeria gave a fresh impetus to French commerce, and this soon led to a modification of the quarantine laws. Marseilles, Lyons, and other places on or near the Mediterranean, strenuously opposed all attempts at reform. Italy protested, and accused France of opening the way for the admission of all kinds of diseases, and solely for the sake of gain. M. de Ségur Dupeyron, who was Inspector of Quarantine, became a warm and able advocate of reform. He did much in his reports to show the abuses of the system and the insufficiency of many of the most annoying regulations to effect any good. The result of the efforts of Chervin, Roche, Dupeyron and others, was, that a report was made on the subject by the Academy of Medicine, urging, in the strongest terms, the necessity for reform.

A Royal Ordinance followed on the 18th of August, 1847, removing many of the restrictions condemned by the medical authorities. Other reforms followed in 1849 and 1850. Thus was France freed from many of the restrictions which, like a nightmare, had rested for hundreds of years on commercial regulations.

The first Conference, 1851.—The first International Conference held was that of Paris in 1851, in which twelve European States were represented—Austria, Sicily, Spain, the States of the Church, France, Great Britain, Greece, Portugal, Russia, Sardinia, Tuscany, and Turkey—that is, with the exception of Portugal, the southern States of Europe bordering on the Mediterranean. Each State was represented by two delegates—a diplomatic agent and a physician.

The object of the conference was the same as in similar assemblies to-day, to arrive at a uniformity of sanitary measures, and a regular method of applying them in order to prevent the importation of diseases considered to be contagious —principally plague, yellow fever and cholera—and to form for this purpose an international code which should be binding on all the contracting parties. The success of the conference is well known. Mr. Melier labored indefatigably to ensure its success. A general convention was agreed upon, and a code embracing 137 articles, comprising all the details relating to an international sanitary service, was presented, and also a code for the uniform guidance of all the contracting parties.

The results are also well known, for it was necessary to conciliate all the conflicting interests represented.

Sardinia and Portugal were the only States that signed the agreement with France; the other States, for different reasons, refused to accept it. This convention, and the rules attached to it, formed the basis of the sanitary system of France from the time of their adoption in 1853 until they were finally repealed on the 22d February, 1876.

However, in 1865 it was rejected by the Italian government, and subsequently by Portugal, these two States resuming their former freedom of action.

The cause of the failure of this conference, in which measures of conciliation were carried to an extreme, was no doubt the regulation which obliged the different contracting States to a uniform system of administration, which measure had the serious objection of being contrary to the customs and usages of the governments represented in the conference.

The second Conference, 1859.—This was composed exclusively of diplomatic agents. It was convened for remedying, by means of a new agreement, the objectionable features of the convention of 1851.

The result was a new project, and one much more acceptable than the preceding, because it allowed greater liberty of action to the different governments. The international restrictions were removed, and only the fundamental points of the agreement were retained. Still, for reasons which it would be difficult to specify, but which evidently arose from the diversity of interests among the parties trying to effect an agreement, the attempt was unsuccessful.

The third Conference, 1866.—This was held in Constantinople, in 1866. It was convened on account of the epidemic of cholera which had invaded Europe through the Red Sea.

On this occasion all the States of Europe, and also Persia, were invited to be present, making, in all, sixteen States. Nearly all the States were represented by a diplomatic agent and a physician. Each State had two votes on all questions, provided that both representatives were present.

The sole object of the conference was to study cholera from an etiological and prophylactic point of view. It was expected to propose the most efficient measures for the prevention of new attacks of the disease in Europe, with the express condition, however, that the means proposed should not be enforced on any State without its express consent.

The conference spent eight months in its deliberations; it studied thoroughly the etiology and prophylaxis of cholera; it proposed such measures as seemed best for the protection of the various States represented. Although it was on the whole a failure, the facts which were developed had the effect of leading each State to modify its sanitary regulations more or less in conformity with the principles recommended by the conference. Turkey in the Mediteranean, and England in the Indies partially put in force the regulations recommended.

It must not be inferred, however, from the unprofitable results of the three conferences named, at least in so far as regards a diplomatic agreement as to a common course to be pursued which should be obligatory upon all for the restriction of pestilential diseases, that they were entirely without influence on the practical sanitation of the different States.

Quite the contrary; they have contributed very much to cause the removal from quarantine practice of many things that were absurd and even barbarous. They have, by a more at-

tentive study of facts and a more careful discussion of details, effected an approximation of views which, previous to these conferences, seemed wholly irreconcilable, and they have proved to the world, that, practically, exaggeration in any cause is destructive of all progress.

In a word, they have, by their judicious conclusions, so changed discordant elements as to lead to more rational methods in practice, if they have not led men to entertain the same views on international sanitary questions.

The fourth Conference, 1874.—This conference assembled in Vienna under the auspices of the Austro-Hungarian government.

Towards the close of September, 1873, the Austro-Hungarian government informed foreign governments of its intention to invite the different powers to assemble in Vienna for the purpose of forming an international sanitary conference, which should be charged with devising such sanitary measures for the prevention of future epidemics in Europe as they might deem most effective. The most important work proposed for it was to revise the work of the conference of Constantinople. Its duties were to take up again all the questions relating to the etiology of cholera; to inquire into the possibility of arriving at an international agreement in regard to the prophylactic measures to be put in force against the disease. This part, it may be remarked, embraced questions of a practical nature. It was hoped that, as they had been fully discussed and generally accepted at previous conferences, they might be easily so arranged as to form the basis of an international agreement.

The second object was the organization of a permanent international commission for the study of epidemic diseases and their prophylaxis. This was the new feature of the programme, and the one to which the Austrian government seemed to attach the most importance. The idea was an excellent one, but it was easy to foresee that it would have to encounter great difficulties in putting it in practice.

The scientific questions were determined, as at Constantinople; but, as might have been easily foreseen, the conference was divided into two parties on the question of quarantines applicable to Europe as a protection against cholera, and an agreement on this question could be arrived at only by yield-

ing to each side the points which it considered necessary for the protection of its material interests.

In reference to the proposed institution of a permanent international commission on epidemics, difficulties arose which could be settled only by diplomatic agents.

Finally, the two sections, one having charge of the prophylactic measures proposed, and the other the permanent commission on epidemics, were to decide on the measures agreed upon by the conference.

It will not escape the notice of the attentive observer that the work intended for the conference at Constantinople was purely of a scientific character—the study of the etiology and prophylaxis of cholera—and this plan was faithfully followed during the long session. Yet even here the diplomatic agents were as faithful in their attendance as the medical experts, whose duty it was specially to study these questions.

The responsibility for the failure of these conferences rests almost entirely on the diplomatic representatives of the different governments, and on them should rest the blame for whatever loss of life or interruption of commerce may result from the very unsatisfactory nature of the rules governing international communication abroad, but it must be admitted that here, among ourselves, the conduct of the authorities is no better.

In the report of the committee to the fourth national quarantine convention, held in Boston, it is stated as a cause of regret that, although "Quarantine reform had been a prominent feature in the sanitary improvement of Europe for nearly thirty years, and it is with chagrin that your Committee on External Hygiene, after dilligent investigation, found that the quarantine regulations of the United States are nearly identical with the most odious restrictions of Europe thirty years ago." This report was made in 1860, just before the civil war. It submitted a "Code of Marine Hygiene," comprehending provisions in detail relating to measures on departure, during the voyage and on arrival, of all vessels, greatly in advance of any quarantine regulations which had ever preceded. This code appears to have been the basis of all the improvements and legal enactments since it was formulated. It substitutes thoroughly active measures for the prevention and destruction

of disease for detention. The first practical outcome of the adoption of this code by the convention to which it was reported, was the New York law of 1863, well known to have been drawn by the chairman of the committee who reported the code.* It has been very generally copied by other States. The regulations of the National Board of Health, 1879, are, in the main, the same. And here, it may be remarked that, so far as we are informed, the National Board of Health was the first authority to institute measures relating to departure, in New Orleans in 1879, to prevent the spread of yellow-fever from that city. The effort was entirely successful; not a single case escaped by or occurred on board of any steamboat or other vessel which departed from that city during the period of

* Section 9, of the New York quarantine law of 1863, was retained from a previous law for *nefarious purposes*, despite the protest of the author of the law of 1863 and the efforts of the late Hon. Senator, H. C. Murphy, who secured its passage by the Legislature. This nefarious section reads as follows:

"§ 9. Vessels arriving at the port of New York shall be subject to quarantine as follows: 1st. All vessels from any place where disease, subject to quarantine, existed at the time of their departure, or which shall have arrived at any such place, and proceeded thence to New York, or on board of which, during the voyage, any case of such disease shall have occurred, arriving between the first day of April and the first day of November, shall remain at quarantine for at least thirty days after their arrival, and at least twenty days after their cargo shall have been discharged, and shall perform such and further quarantine as the Quarantine Commissioners may prescribe, unless the Health Officer, with the approval of the Quarantine Commissioners, shall sooner grant a permit for said vessel or cargo, or both, to proceed. 2d. From any place (including islands) in Asia, Africa, or the Mediterranean, or from any of the West Indies, Bahama, Bermuda, or Western Islands, or from any place in America, in the ordinary passage from which they pass south of Cape Henlopen, and all vessels on board of which, during the voyage, or while at the port of their departure, any person shall have been sick, arriving between the first day of April and the first day of November, and all vessels from a foreign port, not embraced in the first subdivision of this section, shall, on their arrival at the quarantine ground, be subject to visitation by the Health Officer, but shall not be detained beyond the time requisite for due examination and observation, unless they shall have had on board, during the voyage, some case of quarantinable disease, in which case they shall be subject to such quarantine and regulations as the Health Officer and the Quarantine Commissioners may prescribe. 3d. All vessels embraced in the foregoing provisions, which are navigated by steam, shall be subject only to such length of quarantine and regulations as the Health Officer shall enjoin, unless they shall have had on board, during the voyage, some case of quarantinable disease, in which case they shall be subject to such quarantine as the Health Officer and the Quarantine Commissioners shall prescribe" (Laws of 1856, Ch. 147, §2).

This section is contrary to the whole spirit of the law of 1863, with which, on account of the baseness of quarantine management and influence at that time it was incorporated, and for a time continued to be practiced. But in 1872, under the administration of Health Officer, Dr. S. O. Vanderpoel, this section was made a dead letter, and it has continued so to be under his successor, Dr. Wm. M. Smith. Notwithstanding, it is a disgrace to the statute, and it ought to be abolished.

A. N. BELL.

prevalence of the disease. Every boat and vessel, and all persons belonging to them, were subjected to rigid examination, and no person or thing with the slightest suspicion of danger was allowed on board. The result was that commerce with the city was not interrupted by the detention of any of the departures at the place of arrival—cleanliness subverted quarantine.

Congress established a National Board of Health for the purpose, chiefly, of keeping yellow fever out of the country. Foreign governments establish similar bodies for the purpose of studying everything that relates to the health of the people. Our legislators could grasp only one idea at a time. However, the National Board successfully accomplished the work assigned to it, and more. All the reports made by the committee sent to Cuba to study yellow fever, have been translated and published in nearly every medical journal in Europe and in South America, entire or in part, and they have been given in extenso in all the sanitary journals. Several, of other scientific investigations and reports, have been honored in like manner.

Congress authorized this board to invite foreign governments to send agents to an International Conference at Washington, similar to those previously held in Europe. This was the most numerously attended conference ever held. It included representatives from nearly all the governments of Europe, North and South America, Hawaii, Hayti, Japan and Liberia.

This government was represented by Mr. John Hay, Assistant Secretary of State, who was chosen President of the Conference; Dr. James L. Cabell, President of the National Board of Health of the United States; Dr. Thomas J. Turner, Secretary of the National Board of Health of the United States; J. Hubley Ashton, Esq., Special Delegate; and James Lowndes, Esq., Special Delegate.

Dr. Thomas J. Turner was unanimously chosen Secretary of the Conference, and, as the proceedings were to be published in French as well as in English, Rustem Effendi, the Secretary of the Turkish Legation, was appointed to arrange the reports in French.

The object of the Conference was tersely stated by Dr. Cabell.

"It has long been a growing conviction with the sanitary

authorities of this country that too little attention is paid to the condition of vessels, their cargoes, passengers and crews *at the port of departure*, and that, by reason of this defect, vessels are allowed to go to sea in a condition which greatly favors the development of infectious disease that might have been averted by suitable and timely measures of cleansing and disinfection. Such consequences entail the necessity of a costly application of quarantine restrictions at the port of destination."

Again he says:

"It would indeed be a most desirable consummation if each civilized nation would assume the responsibility of preventing the transmission of its epidemics into other countries, since the end could be accomplished more certainly and with less obstruction to commerce by such means than by throwing upon other nations the burden of adopting costly methods of excluding such epidemics."

A most important statement was made by Dr. Turner in his remarks on Proposition No. IV.:

"The examinations of vessels, passengers and crews at Jeddah, Yambo, Suez, and other ports of departure on the Red Sea, of pilgrims on their return from Mecca, by foreign agents of ports of destination, has saved Europe from irruptions of cholera. *What we ask in this connection is the transfer of a thorough sanitary examination of the vessel, cargo, passengers and crew from the port of destination to the port of departure, because it is more consonant with good judgment, common sense, and, without interfering with commercial interests, largely promotes the arrest of transmissible disease.*"

It will be seen from these extracts that the proposition was a very reasonable one; that it was presented with great force and precision by the representatives of the United States, and yet they could arrive at no agreement. No system, however perfect it may be, will be accepted by all governments so long as they are influenced by selfish interest.

APRIL 5, 1884. T. P. CORBALLY.

THE BEST METHOD OF DISPOSAL OF THE DEAD.

Abstract of Paper read before Sanitary Conventon at Ionia, Mich., Dec. 13, 1883, by FREDERICK GUNDRUM, M.D.

What method of disposal of the dead was first resorted to is not known, but within historic times methods have varied with different people, according to their religious sentiments. The ancients employed two principal methods, viz.: inhumation, or burying; and cremation, or burning. Rome and Greece burned, while China, Egypt and Judea buried in one form or another. As the belief in immortality spread throughout Judea, the stronger grew the attachment to inhumation, and the advent of Christ, together with His death and resurrection, gave the inhumation process the sanction of heaven itself, and dealt a blow to cremation from which it has not recovered. The converts to the doctrines of Christ in Rome and Greece gradually abandoned burning, so that at the end of the fourth century there was but one method among civilized nations. With the feelings of individuals or nations, be they moral or religious, this paper does not deal; it runs in a different channel, viz.: the sanitary aspect. The dead human body is subject to the same laws as other dead organic matter. Decomposition, more or less rapid, sets in according to the favoring circumstances of heat and moisture. In a few hours the deadliest poisons form, rendering quick disposition of the body absolutely necessary. The prevailing method of disposing of the dead will be first considered. The first question is, how long shall a body be allowed to remain among the living? The cause of death should be considered an important factor. A person who has died of a highly contagious disease, such as diphtheria, malignant scarlatina, etc., should not be allowed to remain in the house longer than twelve hours. Such bodies ought to receive attention immediately after death by the plentiful use of disinfectants, etc., and placed in the coffin as soon as possible and not exposed again.

The rapidity of decomposition must be taken into consideration in those bodies not dying of contagious diseases. In hot,

moist weather some bodies undergo very rapid change. The retention of such remains is extremely unwholesome, if not absolutely dangerous. Much has been done by undertakers, however, in arresting decomposition, and bodies can now be much longer retained than formerly. The use of solutions containing toxic agents should, however, be protested against. This method of arresting decomposition tends, and is likely to cover up homicide, and thus shield the worst criminals known to the law. In Germany, France, Austria, and other countries, preventive materials must be free from all poisonous agents. The lighter the garment, like the old-fashioned shroud, the more quickly will it succumb to the ravages of decay. The coffin should be made of the most perishable wood; and lead zinc, etc., for coffins should be strongly condemned.

Various disinfecting and absorbing agents have been used with advantage, placed around the body to subdue the odor of decomposition, such as charcoal, tar, etc., mixed with sawdust or finely ground bark. Well dried, finely powdered peat is one of the best materials for this purpose.

The legislature has wisely interdicted the carrying of bodies of those dying of contagious diseases on trains or public funerals. It should also prohibit exhibiting the dead in churches and other public places.

The final resting place of the body should be sufficiently distant from the village or city not to interfere with the latter's growth. An elevation should be selected, with forest trees, away from sources of drinking water, and out of the way of prevailing winds. Cemeteries are often started as private enterprises, regardless of fitness except as a financial basis. Committees are appointed by village boards and city councils, who locate cemeteries, not one of whom understands a single principle that should guide them in their responsible duty. This beautiful little city, if it continues to bury its dead in the new cemetery and use ice out of the old pond, will soon have the *pleasure* of drinking the percolations from their departed friends.

In times past graveyards were located in the heart of the town, around churches, and even under dwelling-houses; but the pernicious influence of this practice became recognized by the more enlightened people, who interdicted it by law.

The Code Napoleon placed the distance at forty metres. Italy makes it 200 metres. This is insufficient—the further the better. The earth should be dry and porous to be fit for burying purposes. In order to obtain a comparatively harmless and rapid decomposition, we must have a free circulation of air and sunshine.

It is evident that the danger from inhumation is by infecting air and water. Although the infection of the air is the lesser of the two evils, investigation has proven beyond a doubt that foul air has seriously influenced the health of individuals living near burial places. It is from contaminated water that the most serious results are found. Increased sickness and mortality in the vicinity of the old cemeteries of Paris and repeated chemical analyses prove this fact.

It is now known that disease germs may lie dormant in the ground for many years, waiting for a chance to reproduce disease and death. Knowing these facts, exhumation should not be permitted unless it is established that the individual died of a non-contagious disease. It should be made one of the duties of health officers to examine well and spring water, if used for drinking purposes, in the neighborhood of cemeteries, to see that it contains no organic matter.

The body burns, whether placed in the earth or fire; in one case it takes 10 to 20 years, and in the other so many minutes. Cremation is the proper and scientific way to dispose of dead organic matter. When the body is cremated there is no further fear from disease germs in the body. The only plausible objection which has been offered against cremation is that in case of homicide through the administration of deadly poisons valuable evidence might be destroyed; but this is not a serious objection in the face of the many advantages gained. All innovations in sanitary science have had to fight their way inch by inch. Vaccination had a hard struggle, but came out triumphant, and so we predict for cremation a glorious victory, a triumph of good sense and science.—*Abstract from Ionia Sentinel.*

EPITAPHIUM CHYMICUM.

The following epitaph was written by a Dr. Godfrey, who died in Dublin in 1755:—

Here lieth, to *digest*, *macerate*, and *amalgamate* into clay,
In Batneo Arenæ,
Stratum super Stratum
The *Residuum*, *Terra damnata* and *Caput Mortuum*,
Of BOYLE GODFREY, Chymist and M.D.
A man who in this Earthly Laboratory pursued various
Processes to obtain *Arcanum Vitæ*,
Or the Secret to Live;
Also *Aurum Vitæ*,
or the art of getting rather than making gold.
Alchymist-like, all his Labour and *Projection*,
as *Mercury* in the Fire, *Evaporated* in *Fume* when he
Dissolved to his first principles.
He *departed* as poor
as the last drops of an *Alembic*; for Riches are not
poured on the *Adepts* of this world.
Though fond of News, he carefully avoided the
Fermentation, *Effervescence*, and *Decrepitation* of this
life. Full seventy years his *Exalted Essence*
was *hermetically* sealed in its *Terrene Matrass*; but the
Radical Moisture being *exhausted*, the *Elixir Vitæ* spent,
And *exsiccate* to a *Cuticle*, he could not *suspend*
longer in his *Vehicle*, but *precipitated Gradatim*, *per*
Campanam, to his original dust.
May that light, brighter than *Bolognian Phosphorus*,
Preserve him from the *Athanor*, *Empyreuma*, and *Re-*
verberatory Furnace of the other world,
Depurate him from the *Fæces* and *Scoria* of this,
Highly *Rectify* and *Volatilise* his *æthereal* spirit,
Bring it over the *Helm* of the *Retort* of this Globe, place
in a proper *Recipient* or *Crystalline* orb,
Among the elect of the *Flowers of Benjamin*; never to
be *saturated* till the General *Resuscitation*, *Lefla-*
gration, *Calcination*, and *Sublimation* of all things.

HOW TO SAVE TEETH FROM DECAY.

In the discharge of their duties the physician and dentist are daily asked by their patients "What must I do to prevent my teeth from decaying?" The answer must be, "Correct your diet." That is, eat such food, and only such, as contains all of its natural elements. If we eat the products of grain we must eat them with all their elements as furnished by nature. If we eat meat we must eat bones, or our systems will suffer from a violation of one of nature's unerring laws.

Dental development in man is discernible as early as the seventh week of intra-uterine life, hence the importance of a strictly correct diet from the start, if mothers wish to give birth to children who will have perfectly formed teeth. A mother who passes through the periods of gestation and lactation without a sufficient supply of bone and tooth element in her food, will suffer from decay of the teeth, accompanied with pain and suffering in proportion to the extent of the deficiency. The lime from her teeth will be dissolved, taken into the circulation and appropriated by the offspring.

Excepting *civilized* man, all flesh-eating animals eat as much of the bones of the animals they devour as they can break with their teeth sufficiently fine to swallow, and all have good dental organs.

Place before a tribe of Indians everything the earth produces in the shape of food, and they will eat only animal food so long as that lasts; but place them upon a reservation, and feed them as civilized people feed themselves, and they, too, soon suffer from decay of the teeth. Take from either of the above classes their supply of bone which they can get with their animal food, and decay of the teeth is sure to follow. Even our domestic herbivorous animals thrive better by having bone added to their bill of fare. The cow which every year gives birth to young has an excessive drain upon her for bone material, and craves bone to such an extent that she will even try to masticate very large ones, as every farmer boy can testify.

Veterinary surgeons have long known that certain diseases

of their dumb patients can only be successfully treated by feeding to them bone meal.

Any persons engaged in raising poultry know that their birds must have lime supplied to them or they will furnish only soft-shelled eggs.

Bone is now acknowledged to be the best fertilizer for New England farms. Visit one of these farms in the month of June and you can count the hills half a mile away, where the corn grew three years before, by the spots of grass which stud the earth at regular intervals.

The farmer will tell you that bone did it.

This evident deficiency in the soil explains the too apparent lack in the products of the soil.

The educated farmer analyzes his soil to discover the elements that produce his crops. The intelligent stock-raiser informs himself as to the requirements of his stock; yet neither appear to realize the greater importance of carefully regulating his child's diet, and diligently supplying the needed elements.

Arguments in favor of eating bone to prevent decay of the teeth as well as to cure a long list of bone and kindred diseases, might be continued indefinitely; but as a word to the wise is sufficient, it seems only necessary to add that a long and continued experiment has been made upon a family, the results of which fully justify all claims. The bones were selected from perfectly healthy animals, none being used that bore any blemish of abnormal growth, carefully cured without being allowed to pass through any perceptible chemical changes, carefully granulated and incorporated into soups, gravies, bread, etc., in the proportion of from one to three spoonfuls to each pint of soup or gravy.

The relative proportion of nutritive elements in one hundred parts of different kinds of animal food have been found as follows: Beef, 26; pork, 29; chicken, 27; mutton, 29; brain, 20; blood, 21; codfish, 21; white of egg, 14; milk, 7; bone, 51.

H. E. DENNETT.

BOSTON, Mass., April 15, 1884.

A PHYSICIAN who found a neighbor on the road too drunk to walk, and invited him to crawl into the sleigh, was astonished by the query: "Say, Doctor, my family physician is Dr. ——; do you think your carrying me home will make any difference?"

EDITOR'S TABLE.

THE QUARTERS OF OUR SOLDIERS.

There is a class of amateur sanitarians who, with the best intentions in the world, succeed occasionally in doing much harm to the cause of sanitary progress. We refer to the enthusiasts who deal in superlatives and rejoice in sensational head-lines when they come to the front as advocates for reform. It is true that England obtained her Food Adulteration Act mainly by the sensational outcry against "Death in the Pot," which was raised on the results of Hassall's analyses; but this was an exceptional case. Generally over-zealous advocacy tends to the detriment of the cause by showing in some instances a suspicious proclivity to magnify evils. The enthusiast seldom deals with things as they exist. He dives into the literature of the subject, cultivates an appropriate horror for the condition of things therein depicted, and issues forth like the hero of Cervantes to tilt at the phantoms of the past which his imagination has conjured up as existing in the present.

These remarks are suggested by a column article in the *New York Herald* of April 11th, headed in large capitals, "Death-Breeding Garrisons." "The Government Pig-sties." "Evils affecting the Health and Life of the Army." "Reforms Demanded." The article purports to give a summary of a lecture by General Viele, before the Military Service Institute, in which prominence is given to the statement that the principal forts and garrisons of the United States are in an alarmingly bad condition from a sanitary point of view.

This we shall show to be in general terms a misstatement, founded upon past history, and not upon present conditions.

The vast number of soldiers who fall victims to disease during active service in time of war, and especially when epidemic disease breaks out among them, is instanced as showing the manifest importance of sanitation in military affairs. This may well be allowed, but its bearing on the condition of our forts and garrisons in time of peace is not very apparent, unless the

suggestion is intended that since soldiers have so many deadly, and frequently unavoidable exposures in war, it is but little for them to ask and expect that their government will protect them from needless exposures during peace, and provide for them such quarters, food, clothing, etc., as will best tend to preserve them in health, without which there can be no true comfort.

The condition of our forts and garrisons, as represented by General Viele in the *Herald's* abstract, is mainly illustrated by data drawn from a Report on the Hygiene of the U.S. Army, published by the Surgeon-General's Office, ten years ago;—the first instance quoted being the case of Fort Gibson on the Grand River, a post which was abandoned for sanitary reasons before the publication of the report, and replaced by a new post bearing the same name, built on a healthier site in the same locality. Fort Rice, which is also cited, has long since ceased to be occupied as a military post. No facts gathered at a later date are brought forward; but we are told that a critical examination of the United States posts would undoubtedly result in finding radical defects in their sanitary condition. Perhaps so. Much would depend upon the critic's definition of a radical defect. But it is hardly logical to base a sweeping condemnation of our military posts and garrisons on past conditions, and a present *opinion* founded on those conditions.

Let us look at this matter more closely. At the conclusion of the civil war our regular army became distributed over the great West, and posts were established at points dictated by military policy. There were no appropriations at the time for the construction of permanent quarters, and the men, on newly selected sites, had to protect themselves as best they could with their own labor and such materials as were afforded by the country in which they were operating. Many of them were, so far as concerns shelter, to all intents and purposes in the field. To base an article on reform on these temporary and bygone conditions is manifestly absurd. Acting chiefly on the recommendations of the Medical Department, commanding officers took intelligent action, and those camp sites which had proved unhealthy were abandoned. Money was appropriated by Congress for permanent structures, and the miserable and overcrowded field shelters were replaced by commodious bar-

rack rooms. The Report on Hygiene was in the interest of improvement. It indicated what had been accomplished up to the date of its publication and what remained to be accomplished, at the same time disseminating correct views on sanitary matters. It contains the latest published information on this special subject, but we must by no means suppose that nothing has been done in the meantime. We have only to look at the records of sickness and deaths, as given annually in the Reports of the Surgeon-General of the Army, to learn, as well as by an inspection of all the conditions, that an improvement has taken place in the hygienic surroundings of the soldier during the past ten years, and that we assuredly have no evils affecting the health and life of the army, which require sensational head-lines in the daily press for their reform. The sickness among our white troops has diminished one-third; from 1867 to 1873, inclusive, the average annual number of cases of disease was 2,103 per 1,000 of mean strength; while from 1874 to 1883, inclusive, this average was reduced to 1,475. These cases cover all the ailments affecting the soldier, including many which in civil life would call for neither record nor medical attention. We cannot go back of 1867 in this comparison, as the war rates influenced the statistics of 1866. The diminution in the death rate has been even more marked. The average annual rate for the years 1867–73, 12 per 1,000 (not including deaths from yellow fever and cholera), became reduced during the decade 1874–83 to 7.1 per 1,000. Similar results are shown by the figures relating to the colored troops.

We regret that General Viele did not, in the absence of any personal knowledge, bring forward facts of this character to indicate the kind of work which has been done of late years, instead of making an exaggerated case by the presentation of evils which have ceased to exist.

But, while crediting the military authorities, advisory and administrative, with having effected so much for the soldier, we concur in General Viele's condemnation of the casemates of our permanent fortifications as barrack rooms. They are damp, imperfectly ventilated, and, although probably not so crowded now as he represents them to be in his quotations from the old report, they are known, by a comparison with well-constructed barracks, to predispose to affections of the air pas-

sages. Military men are unanimous in denouncing their use as barrack rooms. We hope that Surgeon-General Murray will renew the attack upon them and be successful in ridding the army of this last relic of the methods of the middle ages in the treatment of those who take up arms for their country.

THE CHOLERA-BACILLUS.—The cholera reports on other pages will be read with interest by all who have watched for the results of the investigation. Two more reports have been announced by Dr. Koch (of later date than the report in detail referred to under date of January 8), in which he announces definitely and positively that he has discovered the cholera-bacillus, though he does not as yet demonstrate his discovery by tangible evidence. The bacilli, which seem to be accepted by all the commissioners as the cause of cholera, are described as follows:

They are not quite straight, as other bacilli are, but slightly curved, corunna-like. The curvature may be even so marked that the stave may almost present a semi-circular form. From these curved staves, S-shaped figures, and more or less elongated, slightly undulating, linear forms may be developed "in pure cultivation," of which the first two segments and the last correspond to the form of the bacilli as found in cholera, and which, continuously increasing in number, remain attached to one another." Such bacilli were found in all the intestinal discharges of cholera cases, and in the intestinal canal at post-mortem examinations, but not in any other disease, nor in dirty water from various sources.

In his latest—*seventh*—report, April 4th, from Calcutta, he reports twenty more post-mortems upon victims of cholera, and eleven additional examinations of the dejections of cholera patients—a total of 42 post-mortems and 28 patients. While these last researches do not furnish any new evidence, they confirm the results of previous examinations. Experiments are in progress with reference to the power of certain agents, such as heat, bi-chloride of mercury, phenol, etc., to destroy the bacilli. Dry heat, it is said, kills them; and in moist media they remain active a long time. The most important feature of his latest report, is his account of the discovery of the bacillus in certain water-tanks. It appears that throughout India the inhabitants are accustomed to use water collected in

tanks for drinking, washing and bathing purposes, in close proximity to cesspools and latrines, by which the water is subject to excrementitious poisoning. And Koch observes that it has often been noticed that local epidemics of cholera frequently exist in the vicinity of these tanks among persons who have used the water. The water of a tank thus situated, on examination was found to contain the same bacilli found in the dejections of cholera patients. After the subsidence of the epidemic, the bacilli were no longer discoverable in the water. These observations are accepted as strong evidence in favor of the specific character of the bacillus discovered by Koch.

State and Local Boards of Health Reports.

Connecticut.—The Sixth Annual Report of the State Board of Health for the fiscal year ending November 30, 1883, is a substantial bound volume of 452 pages. It opens with a general statement of the province of sanitation, and the progress it has made in the State for the year.

Dr. Geo. F. Lewis, of Bridgeport, contributes an illustrated paper on the new hospital recently erected in that city, which, according to the description, is a model of economical construction and adaptation. The general plan of the building is in the shape of the block form of the letter E—the body of the letter represents the administration portion of the building, the limbs the two wards, and the cross the porch and main entrance. It is at present finished into basement and one story only. The main wards are 88 feet long, 28 feet wide, 16 feet high at the sides and 20 feet high at the centre—44,650 cubic feet each, and arranged for 24 beds, which gives 102 feet of floor space and 1,860 cubic feet of air space to each bed. Prof. Geo. H. Smyth, of Burlington, Vt., contributes a paper on Hygenic Institutes. It consists in a cogent presentation of the general subject of hygiene in its scientific aspects and progress, under the sustained work of such men as Pettenkofer, Pasteur, Koch and others abroad, in contrast with the bare initiation of an effort in this country by the National Board of Health, which was soon after deprived of power. Dr. Chas. Gardiner, of Hampton, Conn., describes some of the unsanitary conditions of country life, with special reference to filth storage, foul soil and impure water. Wm. Paul

Gerhard, C.E., of New York, contributes a paper on sanitary drainage of tenement houses, illustrated with numerous cuts of defective fixtures and emendations. This paper is followed by a report of the proceedings of the eleventh annual session of the American Public Health Association in Detroit in November last. An abstract of the Annual Report of Dr. C. A. Lindsley, Health Officer of New Haven, contains valuable practical lessons, as illustrated by the excellent sanitary administration of that city. Extracts from the reports of boards of health and health officers illustrate the common results of practical sanitation in some places, in contrast with its neglect in others, well calculated to attract the attention of all intelligent readers. Dr. D. F. Lincoln, of Boston, Mass, contributes a paper on the District School House, illustrated with several plans for constructing, warming and ventilating—commendable to all school officers and teachers, and worthy of the attention of the public. Next follows the special report of Dr. C. W. Chamberlain, the Secretary, which sums up the general status of public health in the State, and the progress it has made under the auspices of the Board—comprehending the outcropping of zymotic diseases here and there, with their causes and the means used for their suppression; and following this, special investigations into the causes of typhoid fever in Yale College and in Waterbury; scarlet fever in Talcottville; diphtheria in Hartford; and descriptions of the sewerage of Waterbury, and Wallingford Water Works.

Registration Report for 1882 is appended. As tabulated for the year, there were recorded: Births, 14,938; marriages, 5,329; divorces, 392; deaths, 11,662. Rates per 1,000 of population: Births, 24; marriages, 8.5; deaths, 18.7; divorces, one in every 13.5 of marriages. Of diseases, pneumonia has been especially prevalent, and all diseases of the respiratory system and upper air passages have been almost epidemic, so frequently have they occurred. Typhoid and typho-malarial fevers have been relatively frequent—the former continued throughout the year, and caused 324 deaths, and now ranks decidedly among the ten principal causes of death. Tubercular consumption killed 1,455—about one in eight of the total mortality.

The monthly report for February compares unfavorably with the ratios for corresponding month for previous years,

the most notable excess being tertian ague. Where the decline of the periodic type and the decrease in malarial cases indicated an entire disappearance of the disease, the reappearance excites attention and the developments will be closely watched, to learn what the prospects are that the malarial type has become a permanent one. As typho-malaria fever still lingers in England, we may expect the same result here, but whether acute ague is to be a regular affliction is another question.

The epidemic of diphtheria continued unabated. In Hartford the death-rate was even higher than in January, and the numbers from zymotic diseases and the infantile deaths were slightly increased over those of January. The total mortality since January, 1883, from croup and diphtheria, was 295, a condition unprecedented in the sanitary history of the State. There is certainly a need for systematic sanitary work, which none but a well-organized board of health can accomplish. Scarlet fever is reported in several cities, but no general prevalence. Measles and whooping cough are quite common. Influenza and bronchitis have been more common than lung fever. For the last two years the maximum mortality from lung fever has been in the spring months, instead of the first quarter of the year, as has been the general rule heretofore for a long time. Malarial fever is extending into Windham county. Hampton and Plainfield report cases. A fatal case of typho-malaria is reported from Granby, and with the exception of the developments before mentioned, are about the usual manifestations for the season. The prominence of typhoid fever continues, but it is more in the cities than in the country. The unusual prevalence of dysentery and diarrhœal troubles at this early season was noted last month. It is still more noticeable in February. Quite a number of diarrhœal troubles are reported. Whether this is an indication of an increasing tendency towards choleric disorders is an interesting question that will be closely studied. The month has been unfavorable to consumptives and to the aged, and marked by a prevalence of bronchitis and congestive lung diseases. In the succeeding month small-pox appeared in Norwich, from paper rags, and in Waterbury, near the quarters of the epidemic of two years ago. The disease was quickly brought under control by efficient work in both places.

The monthly report for March compares favorably with preceding months for the winter, and with the same month in previous years. An increase of typhoid in the old malarial region, as it may be termed to distinguish it from the territory recently invaded, is marked. It is also reported as prevalent in Willimantic, with one death. The total mortality shows some improvement in the reports from Hartford, and the rate of deaths from diphtheria, that has been kept up so long, is somewhat decreased. The disease, however, still lingers in the unsanitary quarters, and by its persistence shows its relation to filth as a nourisher of the virus, if it does not produce it directly. The view is gaining ground very rapidly that diphtheria and scarlet fever can arise without any connection with a preceding case. Nearly every month cases are reported that present every appearance of entire isolation from any other case.

Scarlet fever is more prominent than before for some time. Whooping-cough is reported as quite prevalent in Saugatuck and Westminster, a few cases in Cheshire and in several towns in Fairfield county.

Cerebro spinal meningitis is prevalent in different parts of the State; three fatal cases occurred in Greenwich; two were of malarial origin, and died in thirty-six hours after seizure. A fatal case is reported from Canton, and severe cases are quite often mentioned; also other forms of meningitis.

Of unusual causes, a death from fright is reported, and a case where glanders was transmitted to man, with the inevitable fatal termination.

MICHIGAN.—Reports for the month of March compared with the average for the month of March in the preceding six years show that cerebro-spinal meningitis was more prevalent, and pneumonia, rheumatism and remittent fever less prevalent in March, 1084.

For the month of March, 1884, compared with the average for the corresponding months for the six years, 1879–1884, the temperature was slightly less, the relative and the absolute humidity slightly more, and the day and the night ozone less.

Reports for the month of April, 1884, compared with the average of the same month for the preceding six years, show that pneumonia, intermittent fever, remittent fever and diphtheria were less prevalent.

For the month of April, 1884, compared with the average for the corresponding months for the six years, 1879-1884, the temperature was slightly lower, the absolute humidity and the day and the night ozone less, and the relative humidity the same.

MINNESOTA.—Biennial Report of the State Board for 1881 and 1882, pp. 326. This is a thoroughly practical report for the most part—about half of it being devoted to an account of small-pox and the measures taken for its suppression. There were in the two years 44 outbreaks—26 counties were invaded, 499 cases and 96 deaths. The history of its introduction, care and suppression is comprehended in the separate reports of the local health officers. In regard to these reports the Secretary remarks:

"Each in its way gives the facts of the constant popular neglect of the simplest precautions against that disease, and of the opposition to quarantine and vaccination, not only by the ignorant, but by people whom we have the right to believe should be aware of the demonstrated value, and, therefore, of the absolute necessity of those measures as against this disease."

To remedy this state of things, attention is called to defects in existing laws common to other States as well as Minnesota (at the date of this report), in regard to the organization and powers of local boards of health—mere committees of Boards of Supervisors or Councilmen, *when necessary*, in their own judgment, without the requisite knowledge to act themselves, and through notions of false economy commensurate with their ignorance of preventive measures, too conceited to employ an efficient executive to discharge the duties of health officer. The common result is, that there is not an incorporated village, township or city in the United States which trusts to such organizations that is not the loser, pecuniarily, of many times the cost of an efficient local board of health, and that is not guilty of promoting disease and death from a variety of causes.

And while small-pox is perhaps the most dreaded and alarming disease which is likely to overtake communities neglectful of known preventive measures, diphtheria and typhoid fever, which are much more commonly present, are scarcely less preventable by an equally efficient remedy—*cleanliness*. To these

conditions the report before us is particularly urgent, and we are gratified to receive simultaneously with it a fruitful outcome—the copy of a recent—

"Act Relating to Infectious and Epidemic Diseases, and the Preservation of the Public Health," approved March 3, 1883, which requires that "All towns, villages, boroughs and cities (in Minnesota), shall have a board of health who shall have and exercise all the powers necessary for the preservation of the public health. Said board shall consist of not less than three members, one of whom, when practicable, shall be a physician, and such physician shall be health officer and executive officer of the board, and shall receive such compensation for his services as the Council or other body answering thereto, of the town, village, borough or city shall determine." This enactment is a great improvement upon the laws above referred to, which commonly obtain where the medical health officer, when there is one, is the appointee and servant of the board, without any voice in it. And with it, and its powers in co-operation with the State Board of Health, to which this law is subservient, the State of Minnesota may well be regarded as foremost in measures for the protection of the public health.

The special contributions and appendices to the report are: The Meteorology of Minnesota for 1881–'82, by W. H. Leonard, M.D.; Sanitary Water Supply of the State—Analyses made in the Laboratory of the State Board of Health; Typhoid Fever in Indianapolis, by Drs. J. H. Salisbury and I. C. Cockburn; Vaccination—What it Is and What it has Accomplished in Minnesota, by C. N. Hewett, M.D., Secretary of the State Board of Health; brief reports on Diphtheria in Minneapolis, by Dr. I. C. Cockburn; and Trichinosis, by Drs. Parsons and Carl; and the reports and papers read at the Sanitary Conference at Minneapolis, Dec. 6 and 7, 1882, before noticed and in part published in THE SANITARIAN, Vol. XI.

TENNESSEE.—The quarterly meeting of this State Board, April 1st and 2d, was a good deal enlivened by an account of the frequent outbreaks and spread of small-pox at Johnsonville and other places on the Tennessee River, by putting hands afflicted with the disease off of steamboats plying between that river and points on the Ohio. "All these hands," Dr. D. B. Thomas, the reporter, said, "are required to pay monthly to

support the Marine Hospital Service, and are entitled to treatment and to be cared for in any Marine Hospital in case of sickness or disability, free of charge. There is no Marine Hospital nearer than Paducah, and I have never known a case of small-pox from our section that was sent to a Marine Hospital, nor any provision made for the care of such by that department. It has been a burden to our counties, besides the cause of the loss of the lives of many good citizens, and we are continually exposed to it, and without remedy on our part."

Eighteen cases of typhoid fever were reported by Dr. James L. Fite as having occurred among 85 persons in Maple Hill Seminary, Lebanon, from Sept. 5 to Dec. 17, consequent upon the introduction of the disease by a servant girl who had been visiting a neighborhood on Barton's Creek, where there had been cases of fever of a continued type. During the three years' previous existence of the school, it had been remarkably healthy. A careful examination of the surroundings failed to reveal any other cause. A week after she first complained, on Sept. 12, she was sent to her home a mile and a half distant from the Seminary, where she died Oct. 10th. Meanwhile, Sept. 30, the first succeeding case occurred at the seminary; and the third, Oct. 13; the rest following up to Dec. 17. The school was disbanded Dec. 1st, and the pupils placed in homes in the neighborhood. Besides the eighteen marked cases (six of which proved fatal), "several pupils complained from two to four days with headache, malaise, badly-coated tongue and some fever." Another reporter from Lebanon, Dr. M. W. Cowen, under date of March 25, 1884, also reports upon "about thirty cases of typhoid fever. Nothing positive as to contagion, except in one case, came from Nashville, said he had waited on a young man in Nashville who had typhoid fever. We were inclined to the opinion that most of the cases were caused by impure water. On motion of Dr. Atchison, the following resolution was adopted:

Resolved, That the Senators and Representatives from this State in Congress be requested to use all honorable means in procuring the passage through Congress of the bill known as the Casey Young bill, having for its object the re-organization of the National Board of Health.

Next followed nominations to fill vacancies in the Board,

occasioned by the expiration of the terms of Dr. T. A. Atchison, Hon. E. W. Cole, and the Hon. D. P. Hadden.

Dr. Atchison asked to be relieved, both as to presidency and membership, as he could not accept a re-election under any circumstances. He then retired, and the following resolution was unanimously adopted:

Resolved, That the sincere thanks of this Board are due, and are hereby tendered to our retiring President, Dr. T. A. Atchison, for the able, impartial and efficient manner in which he has discharged the duties of presiding officer, and for his zeal as a member in the investigation of sanitary science.

In severing our relation with him as officer and member of the Board, by his voluntary retirement, we feel that we are parting with a most genial and efficient officer and member. He will carry with him in his retirement the most kindly feeling and the highest respect of the Board, both collectively and individually.

Dr. J. Berrien Lindsley was nominated to fill the vacancy. Hon. E. W. Cole and Hon. D. P. Hadden were nominated to fill the other vacancies, and the Secretary was instructed to transmit the three names to the Governor, as the law requires. The Governor at once confirmed the nominations.

An election was then held for President and Vice-President, and Dr. J. B. Lindsley was elected President, and Dr. J. M. Safford, Vice-President.

C. C. Fite, M.D., Secretary.

Committees were revised as follows:

STANDING COMMITTEES.

Vital Statistics—J. D. Plunket, G. B. Thornton, P. D. Sims.

On Prisons—P. D. Sims, E. W. Cole, D. P. Hadden.

Geological and Topographical Features of Tennessee in Reference to Sanitary Relations—J. M. Safford, P. D. Sims, J. B. Lindsley.

Epidemic, Endemic and Contagious Diseases—G. B. Thornton, J. D. Plunket, P. D. Sims.

SPECIAL COMMITTEES.

Water Supply of Tennessee—J. M. Safford, G. B. Thornton, P. D. Sims.

School Hygiene—J. B. Lindsley, P. D. Sims, G. B. Thornton.

Abattoirs—G. B. Thornton, J. D. Plunket, P. D. Sims.

Railroad Hygiene—E. W. Cole, D. P. Hadden, P. D. Sims.

Transmission of Tuberculosis from Milk and Meat of Infected Animals—J. D. Plunket, G. B. Thornton, P. D. Sims.

Inland Quarantine—D. P. Hadden, J. B. Lindsley, P. D. Sims.

WEST VIRGINIA.—Report of the Secretary of the State Board of Health for the years ending Dec. 31, 1881, 1882 and 1883. pp. 305. This being the first stated published report of the Board, it opens with the several enactments establishing it up to its present status—one of the most progressive, and in proportion to the time since it was established, one of the most efficient of the State Boards in the prosecution of their common purpose, the protection of the public health. A prominent feature of this Board, as in that of Illinois, has been the suppression of quackery; and, like its predecessor, it began its work so intelligently as to secure the support of the medical profession from the outset, and consequently has not found it difficult to promptly secure the registration of all physicians competent to practice, or to speedily discover and get rid of those who are not competent. The result is the almost complete riddance of quackery from the State. Prompted by a comprehensive circular from the Secretary, much useful information is presented by correspondents of local boards of health and otherwise, on the topography, domiciliary hygiene, social and moral statistics, epidemiological record and hygiene of the public schools, of practical importance throughout the State. There are special papers on Small-pox, by Isaiah Bee, M.D., "Nailers' Consumption," and other diseases peculiar to workers in iron and glass, by J. L. Dickey, M.D.; How to Nurse the Sick, by Geo. B. Moffet, M.D.; The Relations of Soil to Health, by Geo. H. Rohe, M.D.; Prevention of Malarial Diseases, Charles Smart, M.D.; Our Eyes and our Industries, B. J. Jeffries, M.D.; Ventilation, J. M. Hull, M.D.; Treatment of the Drowned, A. R. Barbee, M.D.; Prevention of Hereditary Constitutional Diseases (Richardson); Excessive Use of Tobacco, Jas. Evans, M.D.; Legislation on Insanity, G. L. Harrison, M.D.; Report of Commission to Examine into the Present System for the Care of the Insane of the State; Eminent Domain of Sanitary Science, and the Usefulness of State Boards of Health in Guarding the Public Welfare, J. E. Reeves, M.D. And, under the head of Veterinary Department, a paper by

E. S. Salmon, D.V.M., on Texas Cattle Fever; Foot and Mouth Disease, by L. D. Wilson, M.D.; Foot Rot in Sheep, by C. B. Robinson, V.S.; and so-called Pink Eye, by Jno. C. Peters, M.D.; Treatment of Horse Scarlet Fever, by C. B. Robinson, V.S. And finally, a financial statement which shows that the State Board of Health has been conducted at an annual cost to the State of less than $500! The report deserves to be placed in the hands of every individual who can read it, in the State.

BALTIMORE.—The Annual Report of the Health Department for 1883 felicitates itself on the results of the sanitary work of the year, with special reference to small-pox, "from January 1, 1882, to July 1, 1883, when the disease was thoroughly stamped out" in eighteen months. The whole number of cases reported for the period was 4,930, and of deaths 1,184—all of which should and would have been prevented by timely vaccination, *before*, instead of after small-pox began. But Baltimore is not singular in this regard, and she finds consolation by comparing this epidemic with others equally disgraceful and proportionately expensive in other cities. When boards of health learn to be perpetually aggressive in preventive measures, small-pox as well as many other diseases will cease to exist in civilized communities; and instead of 217,050 vaccinations, made at a considerable increase of expense of the Health Department for a single year, as in Baltimore for 1883, people will be urged to the adoption of this preventive measure on their own account, without any public expense whatever—for children, at least, as an essential requisite to the privilege of attending school.

The totals of registration of vital statistics for the year sum up:

Population, estimated by police census taken middle of May, 1882: White, 348,900; colored, 59,620—408,520. Marriages, 3,448; births (including 701 still births), 8,605; deaths—white, 6,125; colored, 2,255—9,380.

Rates per 1,000: Marriages, 8.43; births (exclusive of still births), 19.32; still births, 1.71; deaths—white, 20.41; colored, 37.58: 22.93.

Of the total number of deaths, 4,062, or nearly one-half, were of children under five years of age; 3,513 were caused by zymotic diseases. Among the special causes of this large propor-

tion of deaths under five years of age, and from zymotic diseases, filth storage in cesspools and privy vaults throughout the city, in default of sewerage, is uppermost. Consumption, too, which killed 1,272 persons—about one in seven of the total number from all causes—is doubtless greatly increased by the same causes as promote zymotic diseases; and pneumonia, which killed 572, was at least more than one-half due to the same cause. Any reasonable estimate of the value of the lives lost, and the cost of sickness caused by the abominable system of filth-storage which obtains in Baltimore, will show that the pecuniary losses for a single year would pay for an efficient sewerage system, and Baltimore would become, as it deserves to be from advantages of situation and climate, one of the healthiest cities in the world.

BURLINGTON, Vt., reports for the year 1883: Population (census of 1880), 11,364; marriages, 110; births, 350; deaths (including 18 still-births), 242. Ratio of deaths per 1,000, 19.71—for five years previous, 17.95—113 deaths, including the still-births, were of children under five years of age, and of the whole number, 41 were caused by zymotic diseases. 35, or about one in seven of the total number of deaths from all causes, died of consumption.

The chief unsanitary conditions remarked upon are impure water supply, insufficient sewerage, and filthy surroundings.

MEMPHIS, Tenn., according to the Fifth Annual Report of the Board of Health for 1883, has the lowest rate of mortality of any southern city in the United States. The population is estimated at 62,335—40,275 whites and 32,128 colored. Total number of deaths, 1,403—610 whites, 793 colored: ratios per 1,000: whites, 15.19; colored, 35.83; aggregate, 22.50.

Notwithstanding, the proportion of deaths from typhoid, typho-malarial, congestive and malarial fevers throughout the year, but particularly in midsummer, is inordinately large, and suggestive of conditions which cannot too soon be done away with. From these diseases there were 136 deaths, indicating, at the usual rate of mortality, not less than 2,000 cases. There were 206 deaths from consumption—one in six and eight-tenths of the total mortality—a proportion so large as never to take place except in the presence of emanations from an extremely filthy soil or other bad surroundings. There were also

96 deaths from diarrhœal diseases, which, taken in connection with the large number from typhoidal diseases, add to the evidence of a foul water supply.

These considerations greatly emphasize the repeated recommendations of Dr. Thornton, President of the Board, and urge the necessity for completing the sewerage and drainage works, and changing the source of the water supply.

There are still a few people in Memphis who have painful recollections of the calamities which have from time to time befallen that city, and most grievously in 1878–'9, in consequence of the persistent neglect of cleanliness. The public spirit which survived this last epidemic was at the first so feeble as to question whether it were not better to abandon the city altogether than to make an effort to redeem it. But an economical system of drainage and sewerage was undertaken, and in the short period of four years' freedom from yellow fever, her population has well nigh doubled and her wealth quadrupled.

At the least calculation, 300 of her people were killed last year by a filthy soil and foul water. Is this a time to hesitate in the progress of her sanitary work? Her people now seem to be more intent upon what New Orleans is going to do in regard to quarantine than upon her own more important means of protection by internal measures. Not that we would underrate the importance of an efficient quarantine at the mouth of the Mississippi, but that Memphis should take heed of her relapsing into lukewarmness in the presence of increasing danger at her own command.

Of the water supply, Dr. Thornton, referring to previous report, says: "My views have undergone no change, unless to be more positively convinced that the source from which the present supply is drawn should be abandoned. Aside from the objections to Wolf River *per se*, each year, as the population increases above and adjacent to the present water-works, the danger of pollution will increase. An abundant supply of pure water is as essential to the health and well-being of a city as a pure atmosphere. Therefore no effort should be spared to substitute Mississippi River water, which can be properly purified by sedimentation, for the present supply from Wolf River, which cannot be." Bayou Gayoso, which is an open

drain and sewer running through the midst of a populous district of the city, and rarely with water enough to flush it, is a growing nuisance, "the cause of malarial fevers of a very intractable type," and a danger so menacing, in memory of the past, as to be a just cause of astonishment that it should be tolerated for a single month.

There are now in operation 35¾ miles of new sewers and 40 miles of subsoil drains; these, with the old sewers (4 miles), aggregate about 40 miles of sewers in successful operation. In order to correct many erroneous statements made from time to time in regard to the progress and cost of the sewerage of Memphis, including the costs of manholes and such other emendations as the system has required since it was instituted, statistics are given which show that the total cost of the sewerage system, and all the connections therewith, up to date of this report, is about $275,000.

Finally, this forcible though brief report sums up:

"The three essentials to the perfection of the sanitary work of Memphis are: The completion of the sewer system as originally designed, the substitution of Mississippi for Wolf River water, and the treatment of Bayou Gayoso as recommended in Fourth Annual Report"—grading and paving or cementing its bottom and sides sufficiently to prevent the collection of its outflow into stagnant pools and saturating its banks with filth.

THE PITTSBURGH BOARD OF HEALTH has issued an interesting circular showing the advantages of the Municipal Hospital care of small-pox cases in that city, as compared with those who were cared for at their homes.

"Excluding all cases termed by the attending physicians in their reports as *varioloid*, there were treated during the years 1875-76-77-78-81-82, in the Municipal Hospital, 818 cases of small-pox. Of this number, 271 died; equal to a death rate of 33.13 per cent.

During the same period there were treated at home 2,382 cases of small-pox, of whom 974 died, equal to a death rate of 38.82 per cent."

READING, Pa., reports for the year 1883: Population, 47,500; marriages, 634; births, 1,384; deaths, 869, including 83 premature and still-births. Ratio of deaths per 1,000: 18.2. 423 of the deaths were of children under five years of age. 203

died of zymotic diseases, of which there were from cholera infantum, 56; scarlet fever, 41; diphtheria, 16; typhoid and typhus-malarial fevers, 20; dysentery, 13,107, or about one in eight of the total number of deaths were caused by consumption.

Much attention was given to the milk supply during the year, and the report expresses gratification at increased public attention to sanitary conditions generally.

SEWERAGE OF NEWPORT.—Our readers, who are already, for the most part, familiar with the makeshifts of Newport in lieu of sewerage, will be glad to learn that the civil authorities of that city are at last awakened to the necessity of doing something in the way of sewerage for the reputation of the place—not apparently because they think it necessary for the protection of the public health. According to the report of the Newport *News*, the plan is still indefinite, but it appears, in part at least, to consist of the combined system, and in such wise constructed as to utilize all the sewers hitherto laid. According to ex-Mayor Slocum, "Most of the pipe sewers laid in the last few years were constructed in view of any system which may be adopted at any future time," which there is some reason to fear consists in a systemless though limited number of pipes, which will cost the city more to utilize than to do without, and which would in the end be less efficient than if discarded altogether. But since the authorities now seem to have committed themselves to the undertaking it is reasonable to hope that the City Engineer, who has their confidence, will not risk his reputation nor the future health of the city on any patchwork, but that he will combine all the ingredients of a thoroughly healthy system, regardless of all other conditions, before the work is begun.

WARING'S SYSTEM OF SEWERAGE IN PARIS.—Col. Geo. E. Waring will please accept THE SANITARIAN'S sincere thanks for charts illustrating the introduction of his system of sewerage in Paris.—And in this connection we are reminded of a recent letter from Col. Waring to *The Sanitary Engineer*, reminding that astute journal that he has "taken out no patent on *the* Separate-System of Sewerage, only *a* Separate-System," which we supposed everybody interested in the subject knew.

MORTALITY STATISTICS IN THE UNITED STATES.

FOUR WEEKS, ENDING APRIL 26, 1884. Correspondents under this head are requested to send reports promptly.	Total Deaths.	Deaths under 5 years.	Lung Diseases.	Diphtheria and Croup	Scarlatina.	Measles.	Whooping Cough.	Fevers.	Small Pox.	Diarrhœal Diseases.	Annual rate per 1,000.
‡Burlington, Vt., 11,364	22	10	3	1	1	..	..	..	..	..	25.0
Boston, Mass., 427,940	668	194	243	28	12	..	4	10	..	11	20.2
‡Lowell, Mass., 70,000	77	10	21	..	..	..	..	2	..	..	12 5
Lynn, Mass., 38,284	38	10	12	1	..	..	..	..	..	..	12.8
Somerville, Mass, 28,663	30	8	8	2	.	..	..	..	..	..	13.5
Worcester, Mass., 58,295	103	42	24	6	4	.	1	2	..	..	22.9
‡Providence, R. I., 120,000	180	46	35	3	2	..	..	2	..	1	18.0
New Haven, Ct., 72,000	..	..	..	..	..	..	..	..	..	..	....
New York, N. Y., 1,325,092	2490	963	815	124	65	40	26	40	..	48	23.8
Brooklyn, N. Y., 624,118	1001	345	341	40	23	9	6	14	..	11	20.2
Buffalo, N. Y., 155,159	..	..	..	..	..	..	..	..	..	..	....
Rochester, N. Y., 101,900	113	30	36	1	..	..	..	4	..	2	17.0
Albany, N. Y., 97.344	188	64	46	10	5	1	4	11	..	1	25.0
‡Auburn, N. Y., 25,000	33	6	11	1	..	..	..	2	..	..	16 3
Yonkers, N. Y., 21,000	17	4	5	1	..	..	..	..	..	..	10.0
West Troy, N. Y., 13,000	24	5	6	2	..	..	..	1	..	..	24.0
Hudson Co., N. J., 209,000	346	105	102	8	5	1	..	15	..	4	21.5
§Paterson, N. J., 57.000	120	..	17	8	3	3	1	3	..	2	27 4
Philadelphia, Pa., 927,995	1585	577	403	60	47	9	3	63	4	18	18.1
Pittsburgh, Pa., 180,000	288	145	93	17	6	..	2	5	2	.	20.8
Erie, Pa., 27,730	30	9	10	..	..	..	..	3	..	1	14.0
Wilmington, Del., 51,500	78	21	20	1	3	..	..	4	..	..	17.9
Cincinnati, Ohio, 280,000	‖448	111	110	8	8	..	6	7	4	8	21.8
*Cleveland, O., 200,429	167	61	36	11	1	..	1	3	..	1	14.6
‡Toledo, O., 52,000	66	24	26	1	1	..	2	3	..	..	16.7
‡Detroit, Mich., 140,000	260	59	72	32	11	6	4	5	..	3	22.5
Indianapolis, Ind., 100,000.	..	..	..	..	..	..	..	..	..	..	....
Evansville, Ind., 40,000	57	20	19	2	.	5	1	6	..	2	20.2
†Rock Island, Ill., 11,650	4	..	1	..	..	..	..	..	..	..	4 4
‡Chicago, Ill., 580,000	1025	532	235	48	26	24	11	34	2	50	21.2
St. Louis, Mo , 400,000	515	187	154	32	9	1	6	20	..	11	16.7
‡Milwaukee, Wis., 145,000	205	49	54	18	2	..	..	6	..	1	17.0
Omaha, Neb., 50,000	35	17	12	4	..	1	..	..	..	1	13.9
Salt Lake City, Utah, 22,000	39	16	10	3	..	..	..	1	..	..	23.0
§San Francisco, Cal., 235,000	414	..	53	9	3	..	9	20	.	1	23.0
‡Minneapolis, Minn., 90,000	88	34	35	3	1	..	1	2	..	1	10.5
‡St. Paul, Minn., 100,000	75	34	19	8	1	..	..	2	..	1	9 0
Baltimore, Md., 408,520	568	214	142	16	5	33	9	16	..	6	18.0
Dist. of Columbia, 194,910	353	112	120	7	21	..	3	9	..	4	24.1
‡Richmond, Va., 66,000	128	41	40	2	3	1	2	2	..	1	20.9
Lynchburg, Va., 20,240	45	8	10	..	..	..	..	..	..	..	58.0
New Orleans, La., 234,000	1036	546	261	8	3	25	3	24	51	12	30.1
†Nashville, Tenn., 50,000	97	34	22	1	..	1	3	3	6		23.2
‡Mobile, Ala., 31,000	71	16	22	..	.	..	..	5	..	2	27.1
Jacksonville, Fla., 10,000	13	5	3	..	..	..	..	..	..	6	16.9

* 3 weeks; † 2 weeks; § Month of March; ‡ Month of April; ‖ 41 deaths in riot.

MORTALITY STATISTICS ABROAD.

FIRST QUARTER, ENDING MARCH 31, 1884.	Total Deaths.	Deaths under 1 year.	Bronchitis and Pneumonia.	Diphtheria and Croup.	Scarlatina.	Measles.	Whooping Cough.	Typhoid and Typhus Fevers.	Small-pox.	Diarrhœal Diseases.	Annual rate per 1,000.
London, 4,019,361	20382	4738	4270	382	390	549	1104	232	60	283	20.3
Liverpool, 573,202	3325	739	...	15	62	83	109	.	23	28	23.2
Glasgow, 517,941	3333	709	789	71	76	23	217	58	4	64	25.7
Birmingham, 421,258	2129	497	...	21	47	82	33	23	54	25	20.2
Dublin, 351,014	2362	139	459	22	64	3	36	51	..	22	26.9
Manchester, 338,296	2330	527	...	70	84	111	70	11	4	36	27.5
Leeds, 327,324	1960	356	...	26	240	55	19	23	..	21	23.9
Sheffield, 300,563	1703	416	...	7	146	13	54	18	2	13	22.7
Edinburgh, 246,703	1260	231	244	27	33	58	50	23	..	22	20.4
Belfast, 216,622	1342	205	365	5	45	1	31	10	..	38	24.8
Bristol, 215,457	1005	239	..	3	9	8	15	6	..	9	18.7
Bradford, 209,564	960	217	...	1	2	14	7	17	..	6	18.3
Hull, 181,225	861	213	...	22	17	1	12	16	..	8	19.0
New Castle, 151,325	865	220	...	6	48	7	30	11	3	9	22.9
Havre, 105,867	752	7	103	26	1	..	12	9	..	30	28.4
Paris, 2,239,928	14387	1978	1534	758	46	341	135	392	26	814	25.7
Breslau, 290,000	2292	732	311	92	12	59	8	22	..	103	31.6
Brussels, 171,293	1065	213	187	21	1	2	33	12	20	97	24.9
Cologne, 150,513	943	283	53	12	..	7	28	4	..	8	25.1
Christiana, 122,000	654	207	...	17	39	..	7	..	..	29	21.4
Frankfort, 145,100	716	163	...	29	6	..	12	6	..	31	19.7
Hanover, 131,200	641	130	51	34	18	3	5	6	..	1	19.6
Bremen, 119,561	642	212	110	18	9	1	14	7	..	14	21.5
Dantzic, 116,162	752	247	71	40	9	20	6	9		29	25.9
Stuttgart, 109,937	637	203	74	35	1	1	15	2	1	26	23.2
Dusseldorf, 105,287	633	237	74	5	3	7	4	2	..	29	24.0
Nuremberg, 105,176	654	..	109	25	16	..	10	3	..	50	24.9
Chemnitz, 102,713	881	345	41	77	7	9	3	8	..	7	34.3
Madgeburg, 105,000	663	204	63	33	9	25	9	3	..	11	25.3
Elberfeld, 101,000	573	124	47	33	27	1	3	8	..	14	22.7
Barmen, 100,000	536	122	52	13	18	..	12	8	..	24	21.4
Madrid, 475,658	3995	956	1212	318	47	135	44	60	32	132	33.6
Lisbon, 187,404	1686	292	351	25	16	11	6	20	24	54	36.0
Amsterdam, 350,202	2562	...	...	281	20	61	16	6	2	2	28.4
Rotterdam, 166,001	1101	...	...	33	27	..	8	6	..	6	26.5
The Hague, 131,417	770	...	...	26	2	1	..	3	..	7	23.4
Lyons, 376,613	2602	...	544	37	6	26	..	..	130	..	37.6
Berlin, 1,225,065	7023	1989	435	823	114	36	90	27	11	275	22.9
Hamburg, 486,678	3051	892	319	108	30	33	69	88	..	186	25.1
Dresden, 236,000	1584	402	129	191	34	3	41	10	..	36	26.8
Munich, 240,000	1883	586	208	63	16	61	34	10	4	153	30.2
Leipsic, 164,636	1100	390	96	139	7	23	22	16	..	43	26.7
Koenigsberg, 154,000	1240	435	103	82	60	..	7	14	1	73	32.2
Bucharest, 200,000	1610	507	329	70	47	12	5	32	..	67	32.2
Vienna, 759,849	5477	1271	893	114	55	248	23	24	38	181	28.8
Bombay, 733,196	5567	..	...	...	..	50	..	1644	25	..	28.8
St. Petersburg, 928,016	9202	2948	1334	262	162	337	61	348	24	1363	39.7
Alexandria, 212,034	1660	751	71	29	1	..	79	60	2	152	31.3
*Rome, 310,315	8455	1435	1467	174	27	235	41	133	7	756	27.2

* Year 1883.

VITAL STATISTICS OF IMMIGRATION.

NAMES OF STEAMERS, DATE OF ARRIVAL, PORT OF DEPARTURE, NUMBER OF PASSENGERS, NUMBER OF DEATHS AND BIRTHS DURING THE VOYAGE FROM EUROPEAN PORTS TO NEW YORK, FOR THE MONTH ENDING APRIL 30, 1884.

	Vessels.	*From*	*Passengers.*	*Deaths.*	*Births.*
April	2, Elysia,	N pl.s,	224	1	
"	3, St. Gothard,	Palermo,	316	1	
"	4, Salier,	Bremen,	790	3	
"	4, Rhynland,	Antwerp,	733		1
"	5, Baltic,	Liverpool,	492	1	
"	6, Hammonia,	Hamburgh,	1,061		1
"	8, India,	Hamburgh,	479	2	
"	9, Scythia,	Liverpool,	558		1
"	10, Main,	Bremen,	896	1	
"	12, Werra,	Bremen,	1,299	4	3
"	12, Lessing,	Hamburgh,	1,088	2	
"	13, Montreal,	Liverpool,	737		1
"	14, Maasdam,	Rotterdam,	464	3	
"	15, Circassia,	Glasgow,	456	1	
"	17, Labrador,	Havre,	795	1	
"	18, Belgenland,	Antwerp,	683	1	
"	18, Bohemia,	Hamburgh,	1,214	5	1
"	18, Donan,	Bremen,	956		2
"	19, Fulda,	Bremen,	1,312	2	3
"	19, Hohenstemfen,	Bremen,	639	5	5
"	19, Gellert,	Hamburgh,	1,137	2	1
"	20, Island,	Copenhagen,	735		1
"	20, Polynesia,	Hamburgh,	769	1	2
"	20, P. Caland,	Rotterdam,	619	1	
"	20, Nevada,	Liverpool,	484	1	2
"	22, Westphalia,	Hamburgh,	1,220	1	1
"	22, Furnessia,	Glasgow,	1,073	1	
"	22, St. Laurent,	Havre,	280		1
"	23, Rhein,	Bremen,	935		1
"	24, California,	Hamburgh,	1,062	2	1
"	25, Amsterdam,	Amsterdam,	477	2	
"	30, Nebraska,	Glasgow,	400	1	
"	30, Bolivia,	Glasgow,	512	1	
"	30, Rhaetia,	Hamburgh,	1,155		1
"	30, Westerland,	Antwerp,	1,136	1	
			27,136	47	29

RAGS FROM EGYPT.—The U. S. Treasury Department has issued a Circular to Collectors of Customs and others whom it may concern, defining the conditions on which rags may be imported from Egypt, as follows:

The Department has, upon careful and mature consideration of the subject commensurate with the interests involved, decided upon the following methods of disinfection, either of which will be satisfactory to the health authorities of New York City, New Haven, and Boston, who have been consulted in respect to the matter, viz.:

1. Boiling in water for two hours under a pressure of fifty pounds per square inch;

2. Boiling in water for four hours without pressure; and

3. Subjection to the action of confined sulphurous-acid gas for six hours, burning one and a half to two pounds of roll brimstone in each 1,000 cubic feet of space, with the rags well scattered upon racks.

Full and explicit instructions have accordingly been given to Mr. George P. Pomeroy, our Agent and Consul-General at Cairo, and Mr. Francis McNally, a citizen of the United States, has been designated as the Inspector. He will have immediate supervision, under the Consul-General, of the process of disinfection, will be required to give the subject his earnest personal attention, and furnish a proper certificate. Mr. McNally's certificate will show the following facts:

1. His name;

2. The name of the consignee in the United States;

3. The place where the rags were disinfected; and

4. The process of disinfection, which must be one of the processes hereinbefore described.

After that the Consul-General is to authenticate the certificate given by the Inspector. This process is to be observed in the case of every bale of rags, which is to be also marked "Thoroughly inspected," with the name of the Inspector.

Mr. Pomeroy has been told that, although he should not refuse to certify invoices even when lacking the Inspector's certificate, he must give notice to all shippers of rags that these goods will not be permitted to enter the United States unless accompanied by such certificate.

CHAS. J. FOLGER, *Secretary.*

YELLOW FEVER STATISTICS.—Just upon sending the last form of this number to press, we have received from the National Board of Health a tabulated record of yellow fever in the United States from 1870 to 1883, inclusive, which shows the total number of cases for the fourteen years to have been 115,406, and the number of deaths 21,797—18.8 per cent.

The American Medical Association.

The thirty-fifth annual meeting of the Association, held in Washington, May 6–9, 1884, was the largest ever held—about 1,500 registered delegates and permanent members. The Committee of Arrangements, under the chairmanship of Dr. A. Y. P. Garnett, met the conditions with unusual skill, insomuch that the proceedings throughout were conducted without discord or hindrance. In a preventive medicine aspect, however (for to this we shall confine our remarks), the most important presentation was by the President, Dr. Austin Flint, in his opening address. He recognized the low standard of educational requirements in some medical colleges, but he repudiated the wholesale charges, too commonly indulged in, of special deficiency in this regard among medical students.

Making due allowance for some specially flagrant abuses, he was prepared to show that, by a practical experience as teacher of forty years among medical students, they would compare favorably with the students of the sister professions. Moreover, it should be borne in mind that medical colleges, as a rule, were not endowed; that they were, for the most, dependent upon the private resources and exertions of those connected with them. He was, however, no apologist for deficiency in education, either preliminary to, or medical. It was his opinion that every student should have a thorough knowledge of the more liberal arts and sciences. He did not think that the study of the dead languages was absolutely essential to a medical education, but rather the study of physics, biology, and the German or French language, or both.

For the low standard of medical education in some institutions, he had no disposition to apologize. Some private colleges are misplaced in their means of instruction, and lack the requirements for giving a proper and thorough medical education. A large number place their reliance upon State legislation, which is delusive. Our duty is to elevate our profession, and to do this the profession must rely upon itself, recommending changes and improvements in certain measures of immediate practicability. In this the National Association must take the initial step, at the same time co-operating with the medical colleges with an earnest desire for harmonious views and united action, uniformity in the different States, and opposing all differences.

To this end he suggested that a standing committee be appointed upon the uniform action of the colleges. It is not to be expected that all of these desirable improvements can be accomplished at once, but with earnest efforts the result of a higher standard of medical education can be achieved through a board of examiners not engaged in medical education.

The "code of ethics," which has been the subject of much discord, was referred to in the same masterly manner, and with such recommendations as are well calculated to satisfy all reasonable men.

The address was received, as it deserved to be, with eminent satisfaction. And the committees recommended by the President, on medical education and other subjects, duly appointed.

The Committee on

Medical and Sanitary Service on Trans-oceanic Passenger Vessels, through their Chairman, Dr. A. N. Bell, reported progress, and the bill now before Congress (printed in our May number), in promotion of the purpose. The report shows that the rate of mortality on board emigrant ships for the four years ending with 1883 was much greater than for the four years ending with 1873, and that it is now on the increase; that the causes were included in two words—negligence and filth.

The remedy the committee had attempted to apply was better medical and sanitary service, by improving the status of the medical officers, and by this means to secure better service. Drs. P. D. Keyser, of Philadelphia, and J. A. Irwin, of New York, criticised the bill prepared by the committee, claiming that it did not go far enough—that the medical officers of emigrant ships should be exempt from any responsibility or subordination to the masters or owners of the ships in which they serve. The report was accepted and the committee continued:

Dr. Pratt, of Michigan, offered the following resolution, which was adopted:

Resolved, That the American Medical Association urge upon Congress, through their respective Committees on Commerce, the necessity of suitable and efficient legislation to promote the well-being of emigrants to this country, and to protect the public health.

Dr. Pratt also offered the following, which was adopted:

Resolved, That the Association earnestly urge upon Congress more efficient legislation on emigration, so as to exclude from our soil the defective classes of all nations.

The Address on State Medicine, by Dr. Deering J. Roberts, Chairman of the Section, was chiefly devoted to the subject of medical education and its relations to the State, and maintained that it could not be elevated by legislation; that in those States which had laws regulating medical education, the status of the profession was no higher than elsewhere. But he urged the necessity of national sanitary service on a higher plane than hitherto—that instead of a National Board of Health, as at present constituted, there should be a health department with a head co-ordinate with cabinet officers.

The Section on State Medicine was the weakest in its history. An abstract of the papers read is deferred to a future number.

Scientific Investigation for the Prevention of Disease.—Dr. Geo. W. Sternberg, U. S. Army, offered the following preamble and resolutions, which were adopted:

Whereas, We recognize our responsibility as guardians of the public health, and the fact that it is better to prevent than to cure disease; and *Whereas*, Intelligent measures of prevention require an exact knowledge of the causes of disease—which exact knowledge has not been obtained for a majority of the infectious and pestilential maladies which afflict the human race; and *Whereas*, The extension of our knowledge in this direction calls for the persistent and intelligent efforts of men specially trained for such investigations, and brings no pecuniary reward; and *Whereas*, The Congress of the United States has heretofore made liberal appropriations for scientific investigations relating to geology, natural history, the diseases of domestic animals, etc.—all of which are evidently secondary in importance as compared with the subject herein referred to—therefore, be it

Resolved, That we earnestly petition the Congress of the United States to make suitable appropriations for the prosecution of scientific researches relating to the cause and prevention of the infectious diseases of the human race, to be expended under the direction of the National Board of Health, and that the permanent detail of one medical officer of the army, and one of the navy, be authorized for the prosecution of researches of this nature.

Resolved, That a committee of five members of this Association be appointed to present copies of this resolution to the

Speaker of the House of Representatives of the United States, to the President of the Senate, and to the Chairman of the Committee of Public Health, of the House.

Officers elected for the ensuing year: President, Henry F. Campbell, Georgia; first vice-president, John S. Lynch, Maryland; second vice-president, S. D. Mercer, Nebraska; third vice-president, J. W. Parsons, New Hampshire; fourth vice-president, H. C. Ghent, Texas; secretary, W. B. Atkinson, Pennsylvania; assistant secretary, W. H. Watkins, Louisiana; treasurer, R. J. Dunglison, Pennsylvania; librarian, Dr. Kleinschmidt, District of Columbia.

Socially:—The meeting in Washington was made enjoyable by receptions at the Executive Mansion by President Arthur; at the Capitol, by Senator Edmunds, President of the Senate, and Speaker Carlisle; at the Corcoran Art Gallery, by Mr. W. W. Corcoran; by Chief Justice, Mrs. and Miss Waite; Commissioner and Mrs. Loring; by the Surgeon-Generals of the Army and Navy, respectively; receptions and bountiful entertainments by Mr. and Mrs. L. Z. Leiter and Mr. and Mrs. W. T. Hildrup; reception and banquet by the Medical profession of Washington. Besides which, the numerous objects of attraction in and about Washington served to add interest to the occasion and make pleasant memories.

Conference of State Boards of Health, Washington, D. C., May 7th, 1884.

In accordance with arrangements made in Detroit during the session of the American Public Health Association in November last, a meeting of the Secretaries and other delegates from State Boards of Health was held at Washington, D. C., May 7th, for the purpose of effecting an organization by which there might be secured concert of action, co-operation, and a free interchange of views and methods of work between the various States, on all questions regarding the public health. There was present at the meeting Dr. Stephen Smith, of the National Board of Health; Dr. H. B. Baker, Secretary of the Michigan State Board; C. C. Fite, Secretary, and J. B. Lindsley and G. B. Thornton, members of the Tennessee State Board; C. W. Chamberlain, Secretary, and C. A. Lindsley, member of the Connecticut State Board; H. P. Walcott, Secretary Massachusetts State Board; Erastus Brooks, of the New York State Board; E. M. Hunt, Secretary of the New Jersey State Board; J. C. Hearne, Secretary of the Missouri State Board; Chas. H. Fisher, Secretary of the Rhode Island State Board; Chas. N. Hewitt, Secretary of the Minnesota State

Board; Jno. H. Rauch, Secretary Illinois State Board; F. W. Hatch, Secretary California State Board; Irving A. Watson, Secretary, and G. P. Conn, member of the New Hampshire State Board; Thos. F. Wood, Secretary of the North Carolina State Board; R. J. Farquharson, Secretary, and G. M. Reynolds, member of the Iowa State Board; E. S. Elder, Secretary of the Indiana State Board; J. E. Reeves, Secretary of the West Virginia State Board; Jerome Cochran, Secretary of the Alabama State Board; Dr. Stewart, of the Maryland State Board; and J. N. McCormack, Secretary of the Kentucky State Board.

Dr. C. W. Chamberlain called the meeting to order and stated its object; Dr. J. N. McCormack was elected Secretary. The committee on permanent organization, consisting of Drs. Chamberlain, Reeves, Smith, Baker, Fite and Wood, reported that they had carefully considered a number of plans suggested by themselves and submitted by others interested in the matter, and that they had unanimously agreed upon the presentation of the following:

Resolved, That there shall be a conference of executive officers and other representatives of State Boards of Health during the meetings of the American Public Health Association, and at other times if desired. All questions arising in such conference shall be determined by vote by States, each State being entitled to one vote. The officers shall be a chairman and secretary.

Much latitude was allowed in the discussion of the resolutions, and there was a free interchange of views on the part of most of the gentlemen present on all the points contained in the resolutions, as on many others connected with practical health work, after which the report of the committee was unanimously adopted. Hon. Erastus Brooks, of New York, was elected permanent chairman, and Dr. J. N. McCormack, Secretary, and the conference adjourned to meet in St. Louis during the next session of the American Public Health Association. Special subjects for discussion at the next session will be assigned to the members of the conference at an early day.

THE AMERICAN PUBLIC HEALTH ASSOCIATION.

The Executive Committee announce that the Twelfth Annual Session of this Association will be held October 14–17, in St. Louis, Mo.

OBITUARY.

WILLARD PARKER, M.D., LL.D.

In the death of this eminent physician, which occurred at his late residence in New York, not unexpectedly, April 25, 1884, the medical profession loses one of its brightest lights, and the public one of its most esteemed citizens. He was born in Hillsborough, N. H., Sept. 2, 1800. When he was five years old his parents removed to Chelmsford, where he obtained the rudiments of his education, and where, when he was nineteen years old, he took charge of a district school by which he prepared himself, both mentally and financially, for the academic course in Harvard University, from which he graduated in 1826. Having begun the study of medicine, he spent two years as house physician of the United States Marine Hospital at Chelsea, after which he became a private pupil of Dr. John C. Warren, and an assistant in the medical department of Harvard. In 1829 he was resident pupil in the Massachusetts General Hospital, and the following year obtained his degree of M.D. from the Harvard Medical School. He began his career as teacher at once, first as lecturer on anatomy at Woodstock, Vt., subsequently as professor of surgery in the Berkshire Medical College at Pittsfield, Mass. In 1836 he became professor of surgery in the Cincinnati Medical College, where he was intimately associated with the late Professor Samuel D. Gross. He left the Cincinnati institution for a visit to Europe, where he continued to pursue his studies, and from which he returned in 1839 to accept a professorship of surgery in the College of Physicians and Surgeons in New York, a position which he held until 1870, when he was made professor emeritus.

He was for a time one of the surgeons of Bellevue Hospital and of New York Hospital, and consulting surgeon in several institutions. When the Metropolitan Board of Health was created, in 1866, Dr. Parker was made one of the commissioners. The other medical members were Drs. John O. Stone, James Crane (of Brooklyn), and John Swinburne (health officer), ex-officio. He was also prominently identified with the State Inebriate Asylum at Binghamton, and both by precept and example active in the promotion of temperance. He

believed alcohol to be a poison, and advocated its restriction to the exclusive role of the physician's prescription. He was public-spirited, generous and kind; respected, honored and loved; of deep religious convictions and spotless morality; of ardent temperament, dear to his family and friends, and loved by all who knew him well.

LITERARY NOTICES.

LUNACY: Tenth Annual Report of State Commissioner in Lunacy, Stephen Smith, M.D., Assembly Document, N. Y., December 31, 1883.

This pamphlet of 173 pages accounts of the work done by the Commissioner for the last seven months of the year only—he having entered upon the duties of his office about the first of June. It opens with a concise statement of the duties of the Commissioner under the law creating the office, and proceeds with a directness of purpose and actual examination of and inquiry into the condition of the insane and idiotic in the State; the management and conduct of the asylums and other institutions for their custody, etc.; and conveys an amount of practical information for legislators and others interested in the welfare of the unfortunate subjects of inquiry, never before, in this State, so clearly presented. To his predecessor in office, Professor John Ordronaux, M.D., Dr. Smith pays a just tribute for laying the foundations of a State jurisprudence of insanity, and thus clearing the way for the exercise of the functions of the office by his followers. But of Dr. Smith it may be said, he brought to the office a ripe experience in State charity work, with which, in most of its bearings, he had been identified for many years. By his official relations with hospitals and charity associations of various kinds; the city health department; the National Board of Health, and otherwise, he had not only had extensive opportunities, but he was well known to have profited by, and to have so systematized those opportunities as to give him singular aptitude for this much needed service. His work from the outset was methodical and exhaustive, comprehending every part of the institutions examined in all their relations to the well-being of the inmates. The records with regard to medical and other officers and servants; the patients, so far as necessary, to determine their bodily cleanliness; the existence

of infectious disease; their general condition and health; the restraints to which they were subjected; the quality and condition of food and its service; the kitchen and cooking apparatus, in regard to cleanliness; the laundry; the steward's department, books and methods; store-rooms and stores—the system of keeping and auditing accounts, etc.—out-halls, dormitories, lavatories, closets, drainage, etc.; farms, crops, outbuildings; kind and value of produce, etc.; into complaints, with offered opportunity to all who desired, to make any, in private if desired—with regard to any abuses in treatment. In the exercise of remedial measures, the Commissioner found a general desire by the officers and managers for any reasonable suggestions, and no difficulty in securing a cheerful acquiescence in all reasonable requests relating to the care, custody or detention of patients. Under the head of "Persons wrongfully deprived of their liberty," and of alleged bad treatment, the Commissioner remarks upon the most common of all complaints by the really insane—those who are in most need of the care with which they are provided. But he gave a willing ear to all who had any complaints to make. In a large number, a few minutes' conversation was sufficient to determine the demented condition. In some cases, there was sufficient doubt to make it necessary to examine case-books, certificates and correspondence—every facility was readily afforded. In all cases of reasonable doubt, special investigations were promptly made, and the results acquiesced in by the officers and managers without delay. And while it is true that in some cases the insane are rudely treated, and occasionally assaulted, the careful inquiry made by the Commissioner has satisfied him that such occurrences are annually lessening in frequency. In every instance of assaults by attendants they were promptly discharged by the authorities. The returns show that in the various classes, the number of insane in the institutions of the State at the date of this report was 10,705—an increase of 648 over the preceding year. A large number is in county poor-houses, and these of all others are in the most pitiable condition—often crowded into close and filthy quarters, and with nurses chosen from among themselves. Of these the Commissioner makes the following judicious remarks:

"The poor-house should never be anything else than a last

resort for the dependent poor, who require only decent clothing, plain and simple food, and comfortable shelter. For that class of insane who have so far lost all mental perception as to have no appreciation of their condition and surroundings, the poor-house may be a fit place, where they may be housed, fed and clothed. But for the acute and chronic insane, who require special care and attendance, and those who are sensible of their surroundings, and feel degraded by their contact with the paupers, the properly organized poor-house is no suitable place. For the insane, asylum care is alone practicable and allowable, and by asylums should be understood institutions wholly separated from the poor-house management."

The final suggestions and conclusions are:

"1. That poor-house care of the insane be discontinued. 2. That the State asylums should retain their chronic insane and provide for them in cottages on ample farm lands. 3. That the State asylums should become mixed asylums. 4. That the State asylums should have defined districts within which they shall care for all the insane poor. To make this plan of organization feasible, it is necessary to remove the strong objection of counties to the increased expense which State care entails."

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Health Officer's Report of D. C., 1883; Paterson Board of Health Report, 1882–'84; Technologic Training in Reform Schools—Address by William P. Letchworth; Disease-Prevention, a dozen papers by Cornelius B. Fox—Churchill, London; The Hospitals Association; Detention in Asylums—Ralph L. Parsons, M.D.; President's Address before Texas State Medical Association—A. P. Brown, M.D.; Essay on the Senses —Wm. M. McLaury, M.D.; What and Why—Questions about Bicycling—Col. A. A. Pope, Boston; Essay on "Changes of Life"—Alice B. Stockham, M.D., Sanitary Publishing Co., Chicago; New Haven Board of Health Report, 1883; Dietetics for the Sick—Alice P. Stockham, M.D., Sanitary Publishing Co., Chicago; Report of Vital Statistics of Auburn, 1883; Meylert on Opium Habit—G. P. Putnam's Sons, New York; Bödecker on Iodoform in Dental Surgery—reprint from Independent Practitioner, Buffalo, N. Y.

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